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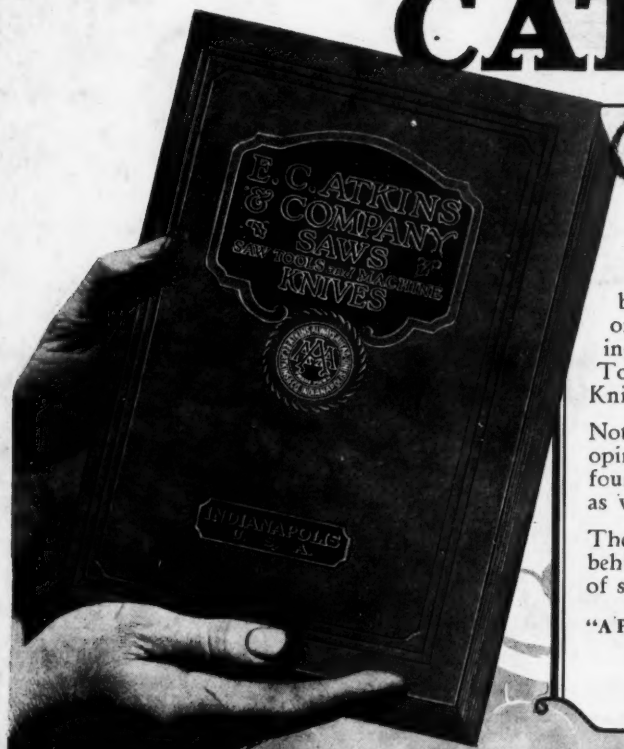

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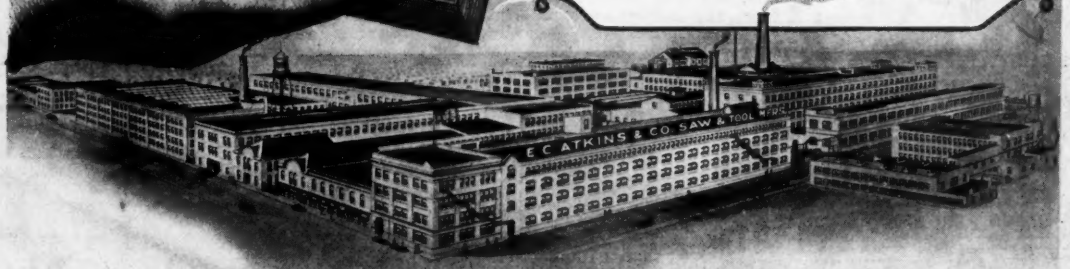

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INDUSTRIAL-ARTS MAGAZINE

Volume XIII APRIL, 1924 No. 4

The Lesson Plan, Job Sheets, and Graphic Aids

C. A. Bowman and F. E. Tustison, The Stout Institute, Menomonie, Wis.

SOME years ago the late Dr. L. D. Harvey, for many years president of Stout Institute, developed in the state of Wisconsin what has been known as the Harvey Lesson Plan. This plan came into quite general use in the state of Wisconsin and at Stout Institute. The plan for any lesson had five recognized major propositions as follows:

I. **Purpose.**
II. **What must be known and done to accomplish this purpose.**
III. **What the pupil already knows or can do of that which is listed under proposition II.**
IV. **What remains to be taught in the order in which it is to be taught.**
V. **Method of teaching.**

In working out the proposition I the requirement was made that the purpose be stated very clearly so that the reason for conducting the lesson is apparent. In addition to the reason for conducting the lesson, the objective to be gained must be clearly indicated.

In proposition II an accurate analysis of the content of the lesson is required. In setting down what must be known and done, it becomes necessary for the teacher to go through a very accurate piece of thinking to get at the exact content of the lesson. The second proposition is strictly an analysis of the purpose to be accomplished.

The third proposition is also analysis but, in this case, it is an analysis of the pupil in relation to the job. The analysis, in this case, is for the purpose of ascertaining as clearly as possible, what the pupil has already learned, and what he has already become able to do in the total list of things that must be known and things that must be done listed in proposition II.

By a process of subtraction, taking those elements listed under proposition III from those under proposition II, proposition IV is reached, namely, the things known and the things to be done which must be taught to the pupil.

Proposition V calls for planning on the part of the teacher of the methods and devices to be used. Usually the plan under step V has five subheadings:

1. **Purpose.**
2. **Preparation.**
3. **Presentation.**
4. **Application.**
5. **Drill (and assignment).**

These subdivisions are the usual ones based on pedagogy. The first subheading usually carries virtually the purpose listed under proposition I. The second subheading, preparation, is that part of the lesson where the teacher, through various devices, brings into circulation in the lesson those things which the pupil already knows and can do which are listed under proposition II. Under the third subheading—presentation—the teacher, using demonstration, questions, and other devices, teaches the new things which are listed under proposition IV. Then in the fourth subheading the new things taught are given application in typical use followed by repetition in legitimate work to give drill and to clinch the new things taught and new things known.

In using this plan for academic classes, as was done when it was first put into use, the content under proposition II consisted virtually of things to be known. In using this plan for shop or drawing classes, especially where the lesson is to involve the use of job sheets as an instruction aid, it is convenient to modify the arrangement of the material under proposition II. Following is a suggested skeleton for the lesson plan for a shop or drawing lesson:

I. Purpose: To teach.....
(To do or to know.)

Where appropriate, an orientation paragraph will be carried immediately below the purpose to orient the piece of work which is to be accomplished by the pupils. This orientation paragraph may in content be diagnosis. It may indicate, when such is necessary, the appropriate setting for that which the pupil is to do or which the pupil is to know.

II. It must be known that.....
1. Materials needed are (quantity and kind).....
2. Tools and equipment needed are.....
3. Procedure (for the pupil in accomplishing purpose) .....

Note: Under this heading either of the following two arrangements "x" or "y" may be used, the one selected being selected because of convenience, ease of use, and accessibility of content when once written.

Arrangement X

(1) First step performed by pupil.
(Enter here following first step in "doing" those things which it is necessary for the pupil to know to accomplish this first step.)
(2) Second step.
(Enter here those things necessary to know to do the second step.)
(3) Etc.

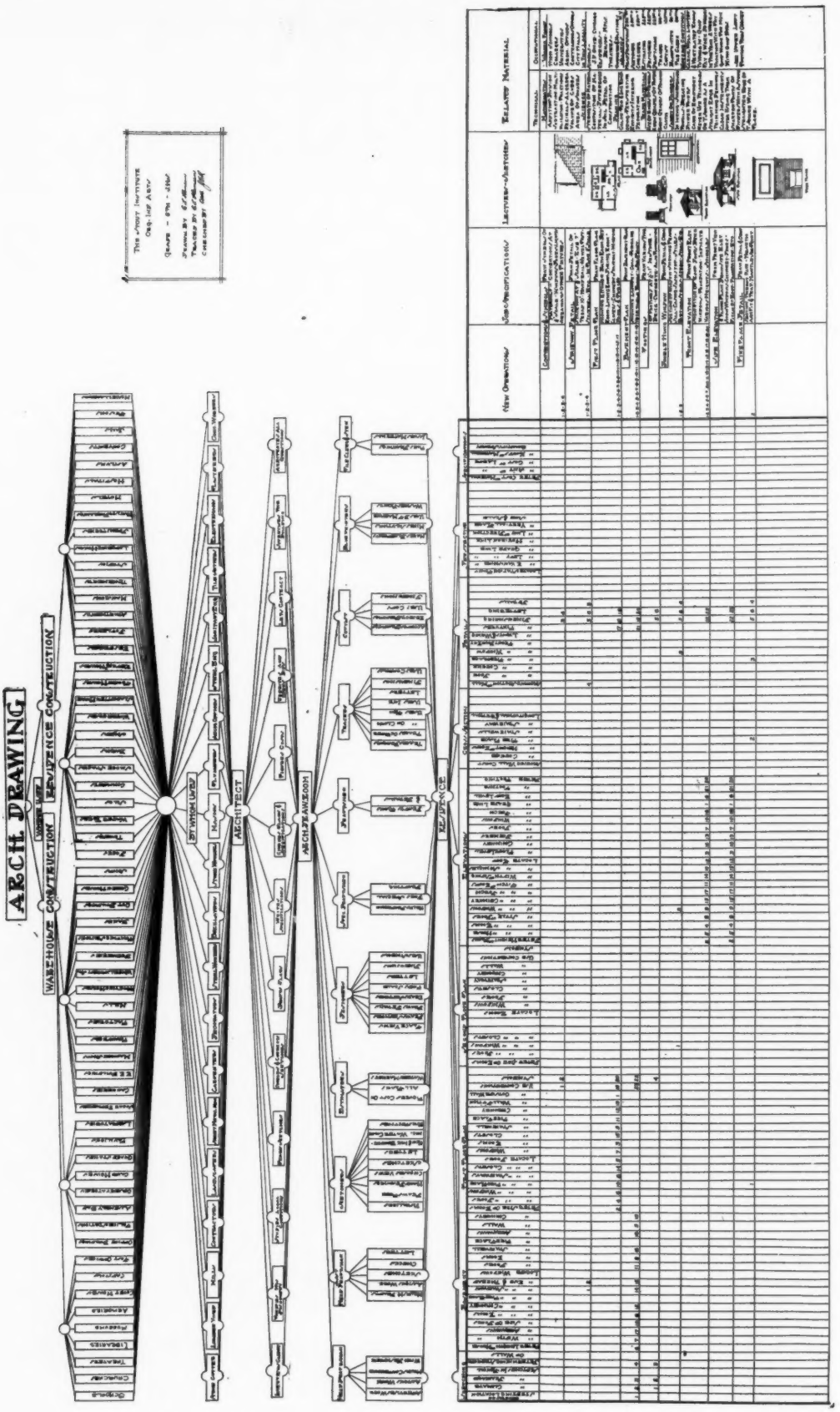

ARCH. DRAWING
WAREHOUSE CONSTRUCTION
RESIDENCE CONSTRUCTION
DRAWING
ARCHITECT
ARCHDRAWROOM
RESIDENCE
Related Material
Lecture-Illustrated
Job Specifications
New Operations

FIG. I.

Arrangement Y

Steps in Doing	Things Necessary to Know
1.	1.
2.	2.
3.	3.
4.	4.
5.	5.

III. The pupils already know.....
The pupils already can do.....
IV. That which remains to be taught in the order in which it will be taught.....
V. Method of teaching.
(Here enter a clear statement in sufficient detail to indicate the action by the teacher in demonstration, in lecture, in questioning, or in use of other devices in carrying on the lesson. If outline form is used, major topics are to be in sentences.)

The arrangement X listed under No. 3 (the "procedure" in proposition II), is very likely the one which would be most convenient if job sheets are planned for the lesson in a junior or senior high school. Arrangement Y would probably be a bit more convenient, in some cases, if a job sheet is planned for use in vocational school classes. In suggesting the form of lesson plan, it was kept in mind that the plan when recorded on paper should be convenient for checking, and the arrangement of content should be such as to make it readily accessible for use in making job sheets should these be necessary.

It might be asked, "Is the job sheet something new in the field of instruction?" Use has been made of job sheets for a long time, but not so much in connection with the teaching of shop subjects. One of the authors has been using such sheets in the teaching of laboratory physics for fourteen years. The use here illustrates the same situation which confronts the present-day shop teacher. In the physics laboratory there is not always enough apparatus to supply each individual. This necessitates rotation in order that each pupil can use the same equipment. The job sheet is resorted to as an aid to take care of such instruction.

The general shop teacher has been calling for just such a sheet to take care of a similar situation. The work in the general shop, especially that of home mechanics, is even more varied than in the physics laboratory and in many cases the equipment more limited. Because of the numerous occupations represented and the various things done, it is impossible for all the pupils to do the same thing at the same time. In fact, the object in many cases is to organize the work so that rotation is the desired result. The job sheet is one solution of taking care of such individual or group instruction.

In writing a lesson plan for a lesson in which it is contemplated handling some of the instruction by means of the job sheet, steps I, II, III, and IV will be handled exactly the same as in writing a lesson plan for a lesson where no job sheets are to be used. In step V the teacher in recording on paper his method of teaching will, if he is to use a job sheet, indicate the manner in which he is to use it. If he plans on some short demonstrations in connection with the job sheet his recording of his plans in proposition V should indicate where those demonstrations are to be given.

The question is often asked if the job sheet is a substitute for the demonstration. If there is a substitute, it is the job sheet, but the job sheet, plus a minimum amount of demonstration, is to be preferred. The demonstration is the live picture of the doing; the job sheet an attempted word analysis of the same operation, plus statements of facts which must be known in order to satisfactorily complete the job. No matter where the job sheet is used, it should lessen the amount of demonstration necessary.

To precede every job in the general shop with a demonstration (as is done in regular shop instruction) would mean too much repeated demonstration. In fact, time will not permit it. If the demonstration is given to a whole group, some time will elapse before the job is begun by certain individuals. In this case, the job sheet functions. It gives in the words of the demonstrator the order and manner of things done. Here it does substitute for the demonstration. If too much time does not elapse, the pupil will recall the necessary operations. While this method is not ideal, it seems to be the best solution suggested.

In determining whether the job sheet will be used or not as the lesson plan is being made, it will be kept in mind that the job sheet is of maximum value as an instruction aid in classes where the class management trends toward individual or group instruction. It will also be kept in mind that the job sheet is of minimum value as an instruction aid in classes where the class management trends toward class instruction. (All individuals on virtually the same assignment.)

In the situation where the job sheet is theoretically of minimum value, namely, where pupils are virtually all on the same type of work, it may be a decided aid to the efficiency of instruction. If, when demonstrations are given, the pupils may use all of the time of the demonstration in watching the demonstration, the best results will be secured. If it is necessary for the pupils to spend some of the demonstration time in writing notes, such time taken will be lost so far as the demonstration is concerned. If the job sheet has in it those directions which could be given on paper just as well as verbally and the only writing necessary by the pupil during the demonstrations is to check such steps in procedure as are demonstrated, efficient work will probably result. It is realized that the temptation is constantly before the teacher when using job sheets to allow the course to become virtually a correspondence course. In shop instruction one extreme is where all of the instruction is attempted on the word of mouth basis and the other extreme is where all instruction is attempted through the printed page. Both extremes should be avoided.

In planning the use of the job sheet in a junior high school or a senior high school the material in proposition I and II of the lesson plan may be used directly. The job sheets appearing in this magazine for home mechanics by Mr. F. E. Tustison of Stout

Institute, illustrate this job sheet arrangement. The job sheets in this series are adapted for use where such related content as is taught is included in the shop instruction itself. They illustrate the use of the "arrangement X" in the lesson plan as a basis for job sheet making. Custom has led to the use of job specifications for the initial division rather than the term purpose. A suggested skeleton form for such job sheets follows:

JOB SPECIFICATIONS: To make; to construct; to assemble, etc.

Where or when the job is done, and when appropriate, a statement of who does the job. The orientation paragraph appearing here may be in the form of diagnosis if desirable. The purpose of the paragraph is to indicate clearly to the pupil the significance of the job he is undertaking. (Illustration here by cut or drawing showing article to be made in use, in operation, etc.)

MATERIALS: Quantity and kinds.

TOOLS AND EQUIPMENT: Quantity and kinds.

(Sketch here is needed.)

PROCEDURE:

(1) First step. (By pupil in performing the job.)

Paragraph here to convey what must be known to do step one.

(2) Second step.

Paragraph here, etc.

In following the material through according to the above skeleton outline, the content of the job sheet may be taken directly from propositions I and II of the lesson plan, the only change being a heading of "job specifications" instead of a heading "purpose." If the purpose of the lesson plan is worded "To teach the seventh grade boy how to rewasher a Fuller faucet," the job specifications would be "To rewasher a Fuller faucet."

If the job sheet is to function with highest efficiency, photographs, sketches, or drawings are necessary. The day's layout in many of the trades, is found in drawings aided possibly by sketches and photographs. Here is a chance for the boy to begin to get a working knowledge from accurate drawings and carefully made photographs. He has, perhaps, worked from drawings to some extent prior to this time. Maybe he has not. In either case the mechanical work of the job is laid out and presented in a manner which puts the utmost emphasis on the use of the drawing. Through necessity the boy studies the drawing as an integral part of his job. It is a question whether photographs or sketches are the better. Both have their use, and it depends upon what is to be indicated. The doing of the job and the use of the finished product can be represented best by the photograph. Drawings or sketches will take care of location, sequence, and names of parts, shapes, manner of assembling and the like. In a sketch we can stress a desired objective and omit entirely any parts or details that are not necessary. However, the life-like effect of the photograph should not be underrated. Compare the solid printed page to one broken by natural pictures and the result is evident.

Figue III is an illustration of a diagram used to locate and name parts for the job sheet with the specifications "To make an electric extension cord." Figs. IV and V are illustrations of photographs used to show how one operation of the doing of the job is performed. Fig. VI is a picture showing the diagrammatic arrangement of the articles needed to complete the job. Accompanying the picture it is possible that a typical electrical diagram should be in the job sheet, to show the usual representation with common conventions.

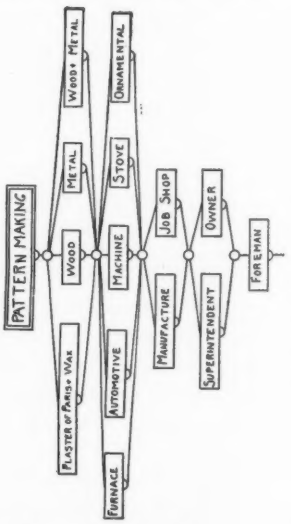
If questions are added to the job sheet, they will be selected from step V of the lesson plan. In using these questions it is possible to so word them as to require a yes or no for the answer. In such cases the questions may be those which must be answered in order to properly check the work done by the pupil in completing the job. If desired, space may be indicated for writing in the answer yes, or no, as the pupil studies the questions after he has finished the job before he hands it in. Opportunity to answer "why" may be given. These questions which may appear in V of the lesson plan are probably from the following groups:

a. Answered through properly doing the job.

b. Related to the job and leading to acquisition of necessary related information for properly doing the job in its technical and occupational significance.

c. Which when answered will clinch the new things done and new things known in the job.

(READ TABLE ACROSS TO OPPOSITE PAGE)



d. Questions relating to new study.

e. Questions relating to previous study or work in shop.

Space should be allowed for some record on a job sheet. Besides the name of the pupil and his classification, the time of beginning and ending the job should be recorded. Since every pupil is doing the job at a different time, this gives the instructor a check on each

individual. In order to test the pupil's ability to answer the questions he is asked, "Have you answered all of the questions?" If he replies, "No," he is told where he can get the answers. If he replies, "Yes," the teacher knows in most cases if he is telling the truth. If the teacher is in doubt, a quick test will soon determine. In most cases a grade should be put down immediately. If written answers to the questions are

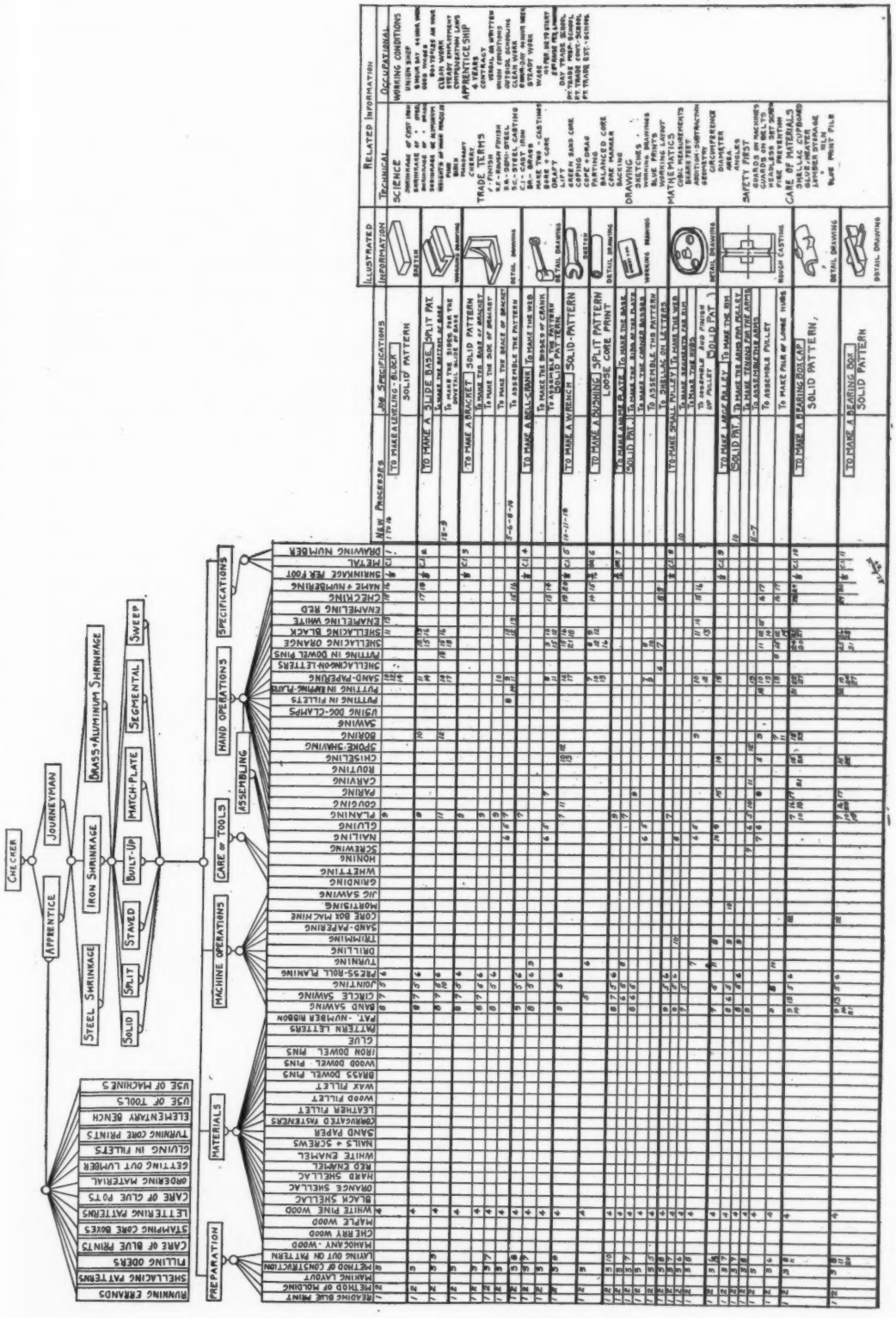


FIG. II. (BEGIN TO READ TABLE FROM PAGE OPPOSITE.)

desired, they should possibly be put on another sheet. The ordinary job sheet could not accommodate all of these answers.

Following is a sample job sheet:

Job Sheet
Home Mechanics (General)
The Stout Institute
F. E. Tustison

JOB SPECIFICATIONS: To make a joint in a round leather belt.

The sewing machine or electric washer is often run with a round leather belt. After running for a time, the belt wears and it is likely to break at the joint. Such a rupture is likely to occur just at a time when the device is needed most and immediate repair would allow work to go on with only slight interruption. The common belt sizes are ¼" and $\frac{5}{16}$".

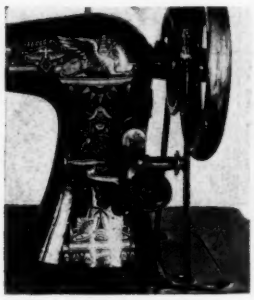


FIG. A. SHOWING JOINT IN SEWING MACHINE BELT.

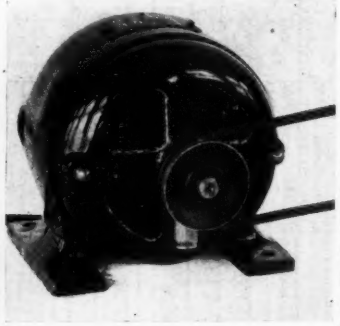


FIG. B. HOME MOTOR USING ROUND LEATHER BELT.

MATERIAL: Round leather belt. Long wire brads; 1½" No. 17 or 1½" No. 16.
TOOLS: Pliers, knife, and hammer.
PROCEDURE:
(1) Square ends of belt.

With a sharp knife square the ends of the belt so that they will make a neat joint.

(2) Make pilot holes for connector.

Measure back from the end of the belt a distance equal to its thickness, and drive in a wire brad. Care must be taken to drive brad perpendicular and through the center of the belt. Do this to both ends.

(3) Make connector.

Butt ends of belt together and measure the distance between the pilot holes. This should be the length of the connector. Cut head from a brad and with the pliers bend it into a staple as per diagram.

(4) Make connection.

Drive one side of the staple into the side of the belt that runs against the wheel, and with a hammer, clinch the connector toward the end of the belt. It is best to clinch on a metallic surface. Connect the other end of the belt in a like manner. **Have your joint checked here.**

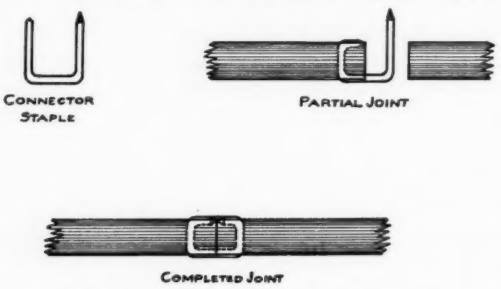


FIG. C. SHOWING STEPS IN MAKING JOINT.

(5) Repairing belts.

The break in a belt usually occurs at one of the pilot holes. If so, remove the broken piece by prying up the connector with a screw driver or similar device. Careful manipulation here will enable you to use the same connector again. Make a new pilot hole in the broken end and clinch as before. This shortens the belt somewhat but a used belt has usually stretched this amount. To set in a piece make two joints as above.

Questions:

(1) Why does belt usually break at the joint?
(2) Which side of the connector should run next to the wheel?
(3) Why does a steel nail make a better connector than a copper wire?
(4) What is belt dressing? What is its use?

RECORD:

Name ..... Class.....
Date begun.....Date finished.....
Have you answered all of the questions?.....
Instructor's Grade.....

In case the job sheet is planned for use in a vocational school recognition will probably be necessary of the reclassifying of what must be known and the kinds of information of a related nature. In this case it is probable that the lesson plan will conveniently use arrangement "Y" listed under No. 3 (the procedure under proposition II). The material listed in the right-handed column, namely, what must be known, would be reclassified and rearranged to indicate the kinds of facts as classified in "The Instructor, the Man, and the Job" by Allen. The job sheet would follow the skeleton outline listed above except that the material to be known listed under each step in procedure might be classified. This classification would make the related information available according to the following divisions. This would render the related information accessible, whether the related subjects teacher handles the instruction or the shop teacher himself. If some of the "what must be *known*" is desired under each step in the procedure it can be so entered. It is probable that if the "what must be *known*" is to be divided into kinds of related information that the division will be some form of the classifications suggested in "The Instructor, the Man and the Job."

A. (Classify drawing needed)
Kind? Reads or Makes? Is it for:
Finding dimensions?
Learning shapes?
Assembling?
Getting out stock?

B. (Classify mathematics needed)
Indicate special methods, devices, etc. Extent and accuracy required.

C. (Classify trade judgment required)
D. (Classify the science required)
E. (Classify knowledge of trade materials)
Separate these as follows:
Characteristics for recognition for proper use.
Characteristics in proper working.

F. (Classify dangers)

	Occupational	Accident	Carelessness	Ignorance
To Self	.....	.....	.....	.....
To Others	...	.....	.....	.....

G. (Classify knowledge about care and use of tools and equipment)
Care while using; prevention of abuse. Care while not in use; protection. Care to prevent loss; how to know where tools are and where to put them.

H. (Classify knowledge of trade terms)
Material Sym. Operation Sym. Location Sym. Special Sym.

In using graphic devices to arrange the record of analysis work, convenience in securing trade portions from the analysis for job sheets should be given consideration. In writing the job sheet following the

skeleton form suggested, the job specifications should be taken from the second column at the right of the chart. If the chart is properly made, these job specifications should be in the form in which they should appear at the beginning of the job sheet. (See Figs. I and II.)

In using graphic devices to arrange the record of analysis work, convenience in securing trade portions from the analysis for job sheets should be given consideration. In the selection of jobs the divisions of work by industry should, of course, be recognized. Within these divisions the selection of jobs may well be on the Kilpatrick four steps: Frequency, significance, economy, and availability; in this instance frequency referring to frequency in which the proposed job is found in the occupational division; significance referring to the moment or depth in content; economy referring to the cost in teacher time, pupil time, in money, and in materials and equipment; and availability referring to the likelihood of learning the job out of school rather than in.

In formulating the paragraph placed in the job sheet to orient the job specifications, if the chart is accurately and completely made out, the upper left-hand portion should give the cue for the major portions of the content of this paragraph. With the job specifications in mind the upper part of the chart is studied, and such information given as is indicated in this part of the chart relative to where the job specified is done, who does it, and under what division or divisions of trade work it is found. See Fig. I. In some trades, especially those where a considerable part of the trade consists of maintenance and repair jobs, information is also secured from the upper left-hand part of the chart relative to the types and kinds of parts involved in the job. Some information will also appear as to where these types and kinds of parts are found.

In listing materials, assistance is secured in the material found in column three. Suggested kinds are listed in this column, the amounts being designated for an individual job. (See also "materials" in upper left portion of Fig. II.)

In listing the tools and equipment, the material in the column at the right is of direct assistance. In some instances in making the job sheet, it is well to carry a sketch or several sketches. These may be working drawings to enable the student when doing a job to secure dimensions. They may be drawings to show shapes. They may be drawings to indicate steps in assembly or the sketch may be a line drawing or half-tone to illustrate to some extent the paragraph carried immediately under job specifications to orient the job. In some instances illustrative apparatus is needed and will be listed here. Where such illustrative apparatus or equipment is needed, information in column three at the right of the chart is of assistance. In some cases material is used as illustrative material and is not to be consumed in the performing of the job. In this case, it will be listed as part of the equipment.

In listing the procedure in the job sheet the first step, the second step, the third step, etc., to be performed by the pupil in doing the job may be taken directly from the chart. (See Figs. I-II.) This series of steps in proper order is secured by following the figures used at the left of the job to check under the basic operations involved in the job. These figures, besides indicating the basic operations involved in the particular job opposite them, also indicate the order in which the basic operations come in performing the job. The type of content necessary in the paragraphs inserted just below each step in the procedure, gives the information which must be known for the particular step in each case. The material for these is suggested by the group classifications in the fourth column at the right.

The questions which are listed are the result of thinking by the teacher, planning those actions he desires by the pupil in checking his job before it is handed in.

In the training of teachers it seems advisable, in many cases to require the individual being trained to write lesson plans. This is merely a device to establish a habit of thought. As soon as the individual acquires this habit and gets out on the job there is not sufficient time to write plans. *It is probably apparent to the reader that the job sheet is a device to clarify the mental lesson planning by the teacher and to so record it as to have material available for placing in the hands of the pupils.* If the analysis charts are properly made, the amount of work by the teacher is reduced to a minimum

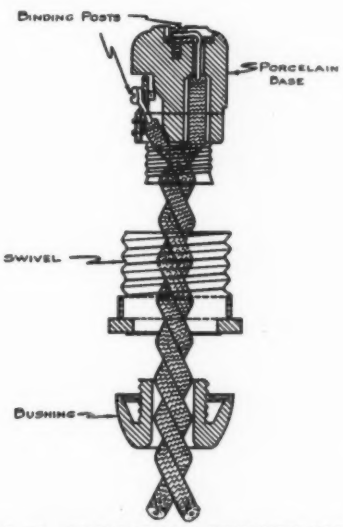


FIG. III. CONNECTING A BENJAMIN PLUG TO AN EXTENSION CORD.

in making the job sheets. Column No. 1 at the right is of significance only when the jobs listed in column No. 2 are given in the order in which they are entered in column 2. Column No. 1 may be ignored if the jobs are not being given in the order listed in column 2. If the jobs are being given in the order listed, column No. 1 is of assistance in determining the demonstrations

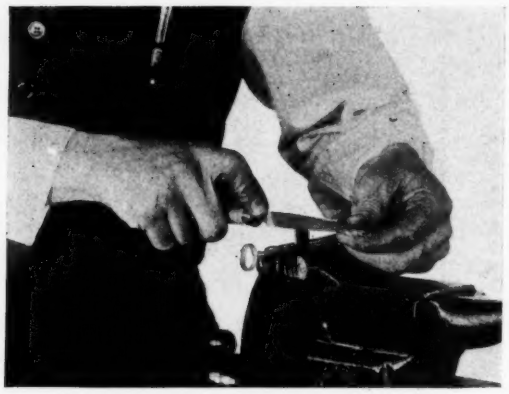


FIG. IV. FILING A COMMON DOOR KEY.

necessary in connection with the students working through the job with the assistance of a job sheet.

In selecting the content for shop classes in junior high schools, senior high schools, and vocational schools, the objectives in each case of the school as a total unit must be kept in mind. It must be recognized that the teacher's professional skill, when considered in all of its phases, has three elements, namely, analysis, selection, and teaching, running through all applications of school work. Any work in analysis should be so recorded as to render the total material analyzed easily accessible in the selection in the light of the objectives of the school in which the course is to be taught. In selecting jobs to be assigned boys in junior high school industrial arts, the objectives of the school as a total unit are represented in cross section in the objectives of the industrial arts work.

To select a shop course for the junior high school in any given kind of occupational content, breadth of sampling or breadth in tryout is secured in two ways. A list of jobs should be selected for the pupil to perform in the shop course in the junior high school which involves a good number of the basic operations. These basic operations should be called into use in typical kinds or types of work. These typical kinds or types of work should be found in the upper left-hand part of the chart. (See Fig. II.)

In planning and selecting the jobs for a senior high school shop course the classifications of pupils in the senior high school should be recognized. It is true that in many of the smaller senior high schools these classifications are not clearly defined administratively. Even though the distinctions have not been clearly made in pupil classification in the administration of the school, nevertheless, the different types of individuals are in the school. Usually some or all of the following groups of objectives are found. There is the boy who is going on to college and whose shop work is either a vocational, part of general education, or a combination of the first two with emphasis placed upon use of his shop studies and shop participation as a core for the study of economics and sociology. There is the boy, also, who is going on to college for technical work. The content of shop courses which he takes will be strongly flavored with present practice in the occupations or trades from which his shop courses are taken. His use of such shop work will be in connection with practical planning or management or practical construction very likely. There is also the boy in the commercial group whose shop work, if any, is either general education or allied to commercial work in such shops as printing. There is the boy whose future is in agricultural work and whose shop work is selected accordingly. There is also the boy who is in the senior high school who is going into the vocation immediately. This boy as a good citizen merits all that he can get on a broadening basis in the high school because of his entry soon into the vocation. The shop courses which he takes must be very clearly made up of present good practice in the vocation into which he is going.

A scrutiny of the above will bring one to the fact that shop work in the senior high school should, as the jobs are being selected, meet certain rather clear requirements. To begin with, it is probable that the boy in selecting his work in the senior high school has participated in a considerable number of the basic operations of the occupation in the course in the junior high school. It goes without saying that the work in the senior high school should be in advance of the work in the junior high school. *This characteristic of being in advance will come about in two ways.* The pupil in the senior high school will, through shop participation, be carried through those *basic operations in which he has not worked* in the junior high school. In addition to this he will be carried through basic operations, which in many cases he has already gone through in the junior high school, but these operations will be applied in *new types and kinds of work.* In other words, those types and kinds of work indicated in the upper left-hand part of the chart in which the pupil has not worked in the junior high school should be included in a senior high school course. The graphic layouts in the figures illustrating this article are selected because of their convenience in assisting in the selecting of jobs as described above.

In selecting jobs for boys in shop work in the vocational school, recognition must be made of the

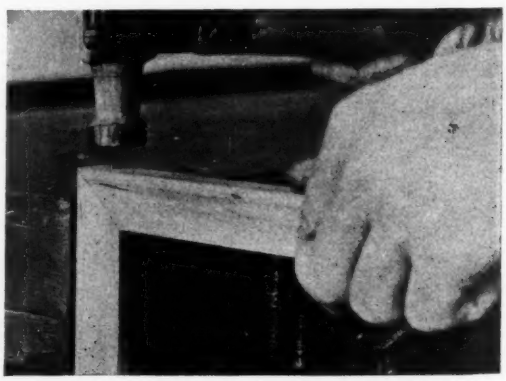


FIG. V. MAKING A PICTURE FRAME JOINT.

objectives of the school just as carefully as in the junior high school and the senior high school. In addition to this, as the work is analyzed and arranged to assist in the selection of jobs, the arrangement besides making the selection of jobs convenient *should also recognize the division of work into occupations in modern industry.* It is well known that in the progress through the family system, guild system, domestic system, and factory system that there has been a trend which, while very clear, has varied in speed in different occupations, to restrict the breadth of content in the group of skills and knowledges called trade, which the individual worker is required to know and to apply in earning his living. In selecting the jobs for the vocational school pupil, part time or evening, the portions of work for him should be in those groupings which are in demand by industry. In addition to this, they should be complete, both in basic operations and types and kinds of work in a given occupation, and in the total in the group of occupations which together may be called a trade.

The figures, I and II, illustrating this article have been selected because in the arrangement of the divisions in the upper left-hand part of the chart in each case *recognition is made of the division of work in present day industry.* In picking content in the junior high school shop courses very frequently the small shop, or the general maintenance or repair shop is the one most nearly like the shop situation participated in by the boy as he goes through the junior high school. If the shop courses are operated in the senior high school, and to a possibly greater extent in the vocational school, the occupational fields from which the jobs are picked should be so arranged in the chart as to be indicative of the arrangements in large shops, these large shops being those which have evolved because of modern large-scale production.

It is sometimes true that even in the vocational school, under favorable circumstances, there is not opportunity because of time restriction, equipment restrictions, etc., to carry the pupil through all of the important types and kinds of work indicated in the upper left-hand part of the chart. Where this is the case the arrangement of these types and kinds in groups, as is done in the figures I and II, will assist in directing the study of these problems. This study, which will be necessary, may be carried on in connection with the shop course or be that study which is followed by the pupil after leaving the course. Presumably the pupil has been carried through all of the basic operations. These basic operations are indicated below the groupings of types and kinds of work at the left of the chart. If the types and kinds of work are grouped above these basic operations, each group being arranged together on the basis of involving virtually the same basic operations, the study by the pupil is helped. Having participated in a given group of basic operations, in studying by himself those types and kinds of work in which he has not participated, he can interpret through those types and kinds in the same group which he has gone through in his shop work. Such study is difficult. It depends largely upon the personal initiative of the individual pupil, and unless materially helped probably never will be carried through. This arrangement of types and kinds in the chart is of probably most assistance in connection with such occupations as that of the auto mechanic where new types and kinds are constantly coming into existence.

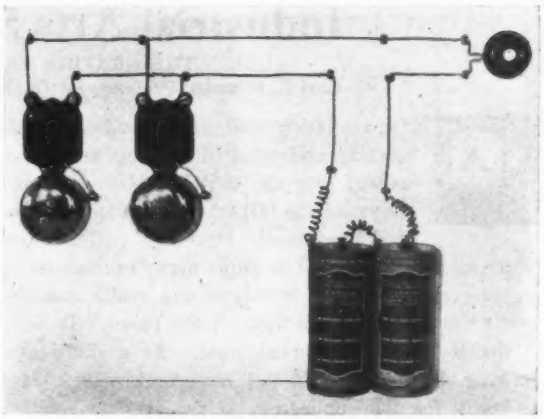


FIG. VI. PARTIALLY COMPLETED ELECTRICAL HOOK-UP READY FOR CHECK-UP.

A CLASS OF EX-SERVICE MEN IN TRAINING IN THE MARINETTE VOCATIONAL SCHOOL UNDER THE VOCATIONAL REHABILITATION ACT.

These men are taking a course in machine shop practice. Their weekly program calls for 11½ hours of machine drawing, 5 hours of pattern making, 3½ hours of applied mathematics and 19 hours of machine shop practice.

The work is carried on under the direction of Geo. W. Schefelker and Theodore Disch.

Industrial Arts Sketching—Part I.*

THE GRAPHIC LANGUAGE—FREEHAND

Carl L. Svensen, Professor of Engineering Drawing, Ohio State University.

AN appreciation and understanding of the meaning and value of drawing would have arrived long ago if it had been commonly known as the "Graphic Language" instead of "Mechanical Drawing." The word "mechanical" has seemed to imply many limitations. It suggests a mechanical procedure and really describes how a design is accomplished on the paper. It refers to the tools and equipment used. As a division of drawing, it has a large and important place. It is necessary for the application of the graphic language to many useful purposes.

The increasing use of the more accurate and desirable name "Graphic Language" will do much to bring about a realization of the possibilities of drawing in education and in industry. A greater use of freehand sketching in the study of the graphic language will tend to separate the "mechanical drawing of lines" from the "reading" and "writing" of graphic descriptions. Sketching is the quickest means of making thoughts visible and communicating ideas which have to do with material forms. Accurate sketching and accurate thinking are each necessary for the other.

FIG. 1. THE PENCIL POINT.

Accurate proportions, "clean cut" lines, and exactness in detail are fundamental requirements for good sketches. The necessary skill must be acquired by careful practice. Inaccuracy, carelessness, indefinite or poorly made sketches are not only a handicap but actually develop the same methods of thought.

The necessary equipment for sketching consists of a medium or H drawing pencil, medium eraser, and paper. For most purposes plain paper is to be preferred. Squared paper, however, is often convenient for design sketches. The pencil should have a long conical point coinciding with the axis about as shown in Fig. 1. In use, the pencil should be revolved in the fingers after every stroke or two. This will tend to maintain the sharp point and give uniform lines.

Sketches are composed of straight lines, arcs, and curves. Proficiency in handling the pencil and drawing straight lines and curves requires patience and practice but is absolutely necessary if any use is to be made of sketching. Sometimes straight parallel lines can be sketched using the edge of the paper as a guide. A better method is to make two short marks and draw from one to the other, as at *A* and *B*, in Fig. 2. The eye must not follow the pencil point but should be directed at the mark toward which the pencil is being

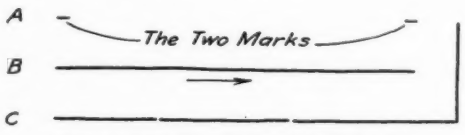


FIG. 2. SKETCHING A STRAIGHT LINE.

moved. Another method which is much used is to draw a succession of short lines almost touching each other, Fig. 2 at *C*. Any method may be used but the result must be a single width definite line.

The point of the pencil must always be in sight. Do not hold the pencil too close to the point and sketch from left to right for horizontal lines as illustrated in

FIG. 3. SKETCHING A HORIZONTAL LINE.

Fig. 3. Vertical lines are sketched downward as in Fig. 4. Note how the pencil is held.

There are two good methods of drawing a circle freehand. The first method is to draw the center lines at right angles. Estimate the radial distance and mark it on each center line and in between them as

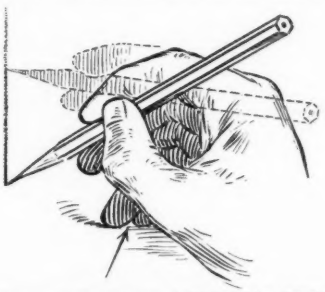


FIG. 4. SKETCHING A VERTICAL LINE.

indicated in Fig. 5. A fairly good circle can then be sketched through the marks. Note that the marks are short dashes and not points.

The second and preferred method is to draw center lines at right angles. Estimate the radial distance and mark it on each center line. Then draw very light lines parallel to the center lines, thus forming four squares. Carefully judge these squares to see if they are all the same size. Make corrections, if necessary, until they are as true as can be judged by eye. Then sketch one-fourth of the circle in each of the four small squares as in Fig. 5. Arcs of circles should be "blocked in" and drawn in a similar manner, as at *B*, *C*, and *D*,

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"Drawing is the education of the eye. It is more interesting than words. It is the graphic language."—From the autobiography of James Nasmyth. 1808-1890.

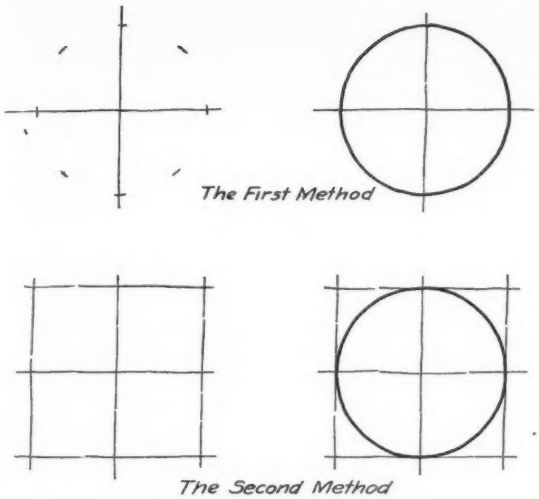


FIG. 5. SKETCHING A CIRCLE.

Fig. 6. Large curves are drawn by a wrist or arm motion with the hand inside of the curve, as at *A*, Fig. 6.

The sketching of a view requires the combining of straight lines and curves but is no more difficult than the elements which have been described, Fig. 7.

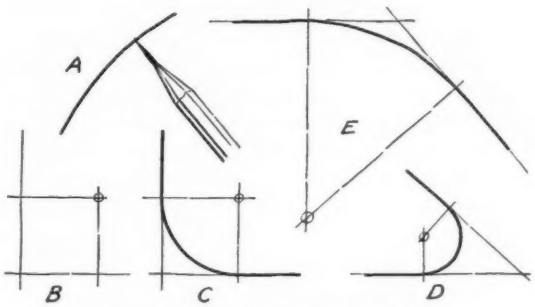


FIG. 6. SKETCHING CURVES AND ARCS.

It is, of course, necessary that the view be correctly proportioned. This is particularly true of idea, design, and other "thought" sketches. There are several ways of securing proportion. Distances may be estimated in inches and lines placed on the sketch to agree with the estimated lengths. Squared paper may be used and the sketch made "to scale." When size makes it convenient the sketch may be made one-half or one-fourth size, estimating the distances. A general and much better method is to estimate the general proportion and then select a part as a unit from which to proportion the views. Too much care and attention cannot be given to the study of accuracy in proportion as the basis for success in making and using sketches. Sometimes sketches are made only for one's own use and so can, perhaps, be made a little less presentable than when made to take the place of a drawing. There is, however, one rule which must never be violated—preserve definiteness under all circumstances. A sketch may be hastily made, but a careless sketch is worse than useless. Be sure that what is given is right and of *certain meaning*.

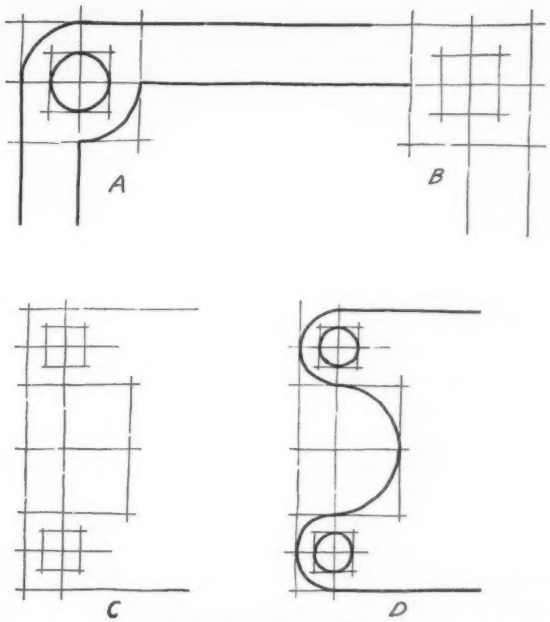


FIG. 7. "BLOCKING-IN" FOR ARCS.

Sketching Exercises

The exercises suggested for sketching practice may be conveniently worked on 8½"x11" plain paper either white or cream. A border line and title space are desirable and may be drawn with instruments or freehand, Fig. 8. If freehand, estimate the distances which are indicated on the layout.

There are four steps in sketching a rectangle as indicated in Fig. 9.

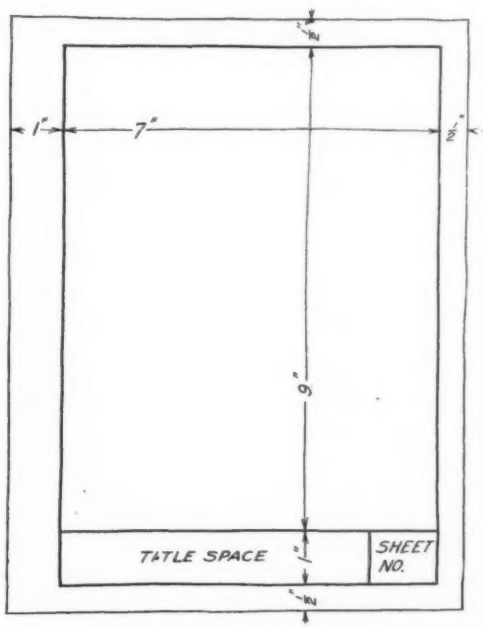


FIG. 8. SHEET LAYOUT FOR 8½ x 11 PAPER.

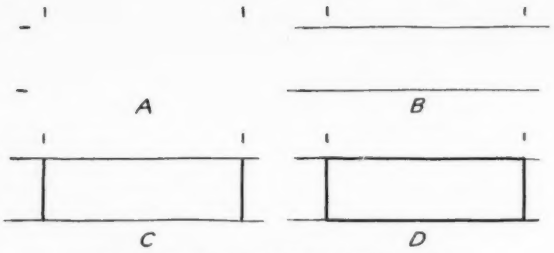


FIG. 9. HOW TO SKETCH A RECTANGLE.

A. Estimate distances.
B. Sketch horizontal lines lightly.
C. Sketch vertical lines, final weight at once.
D. Brighten horizontal lines.

This same procedure is fundamental for all sketching whether for a rectangle, a machine, or a building plan.

Sheet 1, Fig. 10. Divide the 7"x9" working space into four equal parts by sketching light horizontal lines. Near the center of each part "block in" a rectangle about as indicated. Each rectangle should have its long

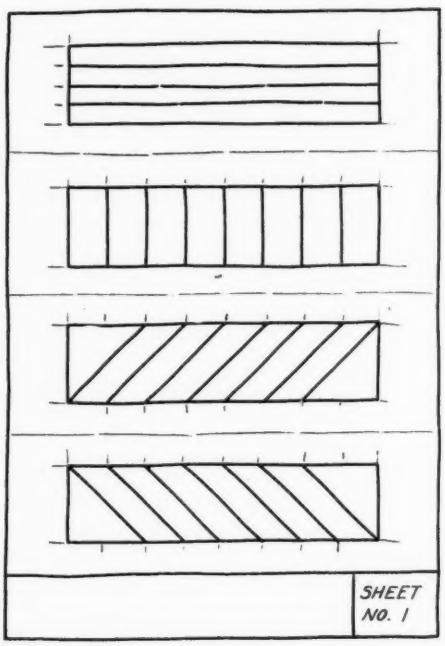


FIG. 10. SKETCHING PRACTICE, STRAIGHT LINES.

dimension about four times its short dimension. Divide the left side of the first rectangle into four parts, estimating distances carefully, and sketch horizontal lines as indicated.

Divide the length of the second rectangle into eight parts and sketch vertical lines as indicated. Third and fourth rectangles to contain slant lines as indicated. Observe carefully the following: equal spacing, parallelism of lines, uniform weight of line, and squareness of corners.

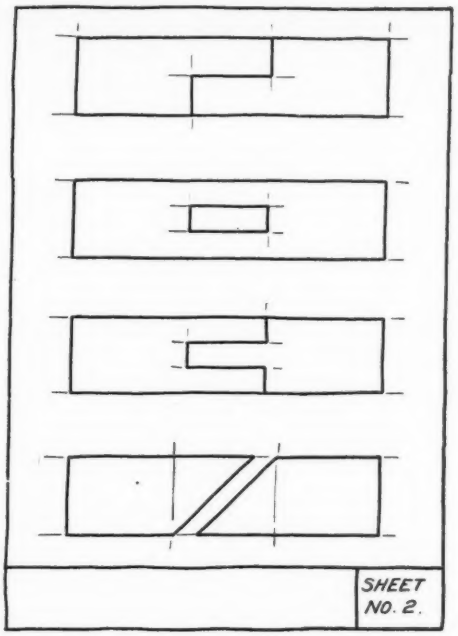


FIG. 11. SKETCHING PRACTICE, STRAIGHT LINE VIEWS.

Sheet 2, Fig. 11. "Block in" four rectangles as for Sheet 1, and sketch in the figures shown. Estimate distances carefully.

Sheet 3, Fig. 12. "Block in" the rectangles and squares about as indicated and sketch the circles and arcs. Complete the figures as shown. The construction lines on the sketches should be drawn so lightly that they need not be erased.

NOTE—The second article of this series will appear in the next issue of the Magazine.—Editor.

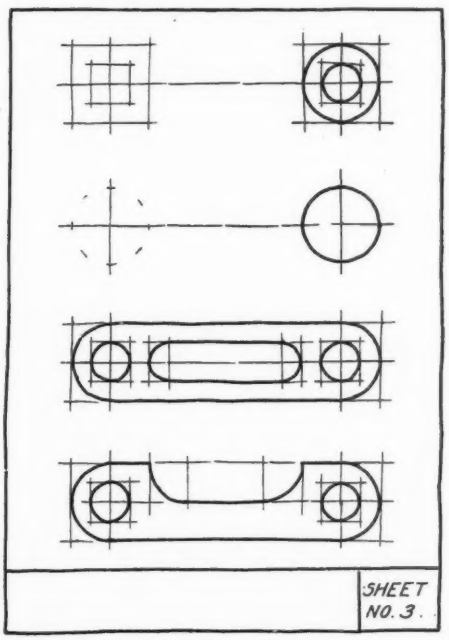


FIG. 12. SKETCHING PRACTICE, CIRCLES AND ARCS.

Modern Methods of Imposition

Robert F. Salade.

WHILE it is true that the term "Imposition," as used in the composing room, applies mainly to the work of locking up book forms, in these days this term broadly covers all kinds of work that is done on the imposition table relating to the make-up of forms of type or plates that are to be locked up in a chase ready for press. Even the work of locking up small forms for platen presses may be included under this term, as well as the work of laying electrotypes on patented base, or on a plate-mounting system of any style.

Remarkable changes have occurred in the methods of imposition during the last few decades, and the various terms relating to this work which were correct some years ago are today, in most cases, considered obsolete. For example, in days gone by the Imposition Man was called a "stone-hand" because in those times he worked upon a table equipped with a marble top. And, in the past, all classes of imposition work came under the heading of "stone-work." Old-fashioned printers still like to use the words "stone-hand" and "stone-work," but the modern printer will usually say "imposition man" and "imposition-work" instead.

Despite the fact that there are still many of the old-style imposing tables in use (those having marble tops), it is no longer the vogue to refer to such a table as a "stone." The modern semi-steel topped imposing tables are rapidly replacing the old-style affairs and in every composing room where they have been installed they have effected economy. The frames for many of the semi-steel topped imposing tables are of pressed steel, while the frames of many others are of hardwood. The semi-steel top consists of a solid casting planed perfectly level and smooth on its surface; planed smooth at its four sides, and rabbetted at the four edges for the reception of the ends of galleys, and so that type forms can easily be shifted from a galley to imposing surface and *vice versa* without danger of the galley slipping. This semi-steel imposing surface is a great improvement over the old marble top, as the slab of marble had to be placed in a wood coffin to hold it securely, and the surface of the marble soon became scratched by the constant shifting of forms.

The composing rooms of practically all of the modern printing and publishing houses are equipped with the new-style imposing tables, and these tables are of various styles to suit the requirements of each office. For example, one imposing table which has proven very popular in medium-size job composing rooms has a cast iron surface 35x50 inches. Underneath of this surface, on one side of the table, are racks filled with a liberal assortment of lock-up furniture and reglet. On the opposite side are twelve letterboards for the storage of standing forms of type; 8 sorts drawers containing individual metal sorts boxes; and, a large drawer at the top for holding planer, mallet, quoins and other tools. The imposition man, working upon a table of this class, will have labor-saving wood furniture, reglet, and other useful material within easy reach, and can lock up many forms for job presses without leaving the table.

Another style of job imposing table has a cast iron surface 39x63 inches, and contains on one side a large amount of labor-saving reglet and furniture arranged in standard units, also racks for holding twelve chases or forms. The other side of this table is taken up with 8 drawers containing individual metal sorts boxes; fifteen blank drawers for holding electrotypes; eleven letterboards; and, the usual large-size drawer and galley bin. Still another style of job imposing table has a cast iron surface 39x63 inches. On one side are racks filled with labor-saving units of furniture and reglet, galley bins at the top, and racks holding twelve chases or forms. On the opposite side are eight drawers containing individual metal sorts boxes, 68 galley shelves arranged in four tiers, and twelve racks for holding chases or forms. The form racks in this table are adjustable to hold chases for any size of platen press.

One of the larger sizes of imposing tables is equipped with a cast iron surface 51x75 inches, and contains on each side 39 letterboards, arranged in three tiers, and numbered consecutively on the upright posts. In other words, this table contains a total of 78 letterboards, providing a great deal of space for the storage of page forms. Another large-size table has at one side two drawers and four sections of racks containing a wide assortment of labor-saving furniture and reglet. On the opposite side is a complete galley storage system for the systematic arrangement of pages on individual galleys, there being a total of 154 steel galleys set up in seven tiers of steel runs, and numbered consecutively on the upright posts. Many other styles of imposing tables could be described but those which have been referred to will give an idea of the utility and economy of the modern tables over the old-style "stones" of some years ago. Of course, the utility of an imposing table is greatly enhanced by devoting the open space underneath it to furniture racks, letterboards, chase racks, etc., and at the same time a saving in floor space is accomplished.

The Imposition Man's Equipment

By having his own private collection of tools the imposition man will not only save a great deal of time but will be in a position for doing the most accurate kind of imposition work under the best of conditions. A "tool kit" made up of the following useful articles is recommended:

Medium size "L" square.

Large size "T" square (or "Tee" square), graduated to picas, nonpareils and inches.

Standard line gauge, graduated to picas, nonpareils, agates and inches.
Combination type-high, base and plate gauge.
Pair of tweezers.
Steel bodkin with wood handle.
Set of engravers' tools.
Folding ruler that opens to 3 feet long.

All of these articles can be purchased at a first-class printers' supply house. This kit would cost a considerable sum of money, of course, but it would be money well spent, and by its possession the imposition man would have many advantages not enjoyed by the ordinary worker in this line. Both the "L" square and "T" square could be continuously used in the important work of squaring and lining up forms, especially book forms. The standard line gauge would prevent many an error when imposing forms of advertising composition. The combination type-high, base and plate gauge tells in an instant the correct height of type, mounted plates or press bearers (.918 inch), as well as the standard thickness of unmounted zinc, halftone and electrotype plates, also the two heights of bases for the unmounted plates. The steel bodkin would be exceptionally useful in lifting monotype characters from forms to be corrected. The set of Engravers' tools would come in handy on many occasions for removing "dead" metal from plates, repairing plates, etc., and the folding ruler would provide for many measurements of forms and stock which could not be determined with a ruler of shorter length.

Imposition of Job Forms

In the modern printing plant having both cylinder and platen presses, there is usually a separate department for job composition, and in such a case there is usually one man who has charge of the imposition of all job forms. It is the duty of this man to lock up all of the forms that are to be worked on platen presses; he also attends to all corrections and changes which are essential in forms; and, when forms are dead, he unlocks them and places the type matter on the dead bank ready for distribution.

The average man having charge of job imposition must be a rapid worker, and one who is trained to handle and lock up a great variety of forms without loss of time. At all times he must keep "working ahead of the press-room," so as to have a number of live forms locked up and ready for each press. Moreover, all of his work must be done in an efficient manner so that every form will be locked up perfectly tight, as on platen presses type characters are more likely to pull out of forms than on cylinder presses, on account of a form being in a vertical position on the average job press, while on a cylinder press the form lies flat on the bed.

The imposition of job work includes forms for the following lines of printing: Business cards, business stationery, labels, folders, small booklets, circulars, ruled blanks, factory sheets, loose leaf sheets, placards, tickets, blotters, wedding invitations, announcements, covers for catalogs, paper box wrappers, etc. Only a few of the well-known lines are mentioned here to give some idea of the many different kinds of forms which are to be locked up for platen presses. In many instances, it is necessary for the imposition man to take a number of small forms, like those for labels, envelope enclosures, and so forth, and to lock them up together in one chase. In other cases it is often essential to lock up two forms of the same kind in a chase for such lines as letterheads, note-sheets, circulars, billheads, etc. A form of this class is called "two up," meaning, of course, that the two forms are to be printed as one operation, the printed sheets to be cut apart afterwards. Other jobs of various kinds are run "three up, "four up," "five up," and even more, according to the size of the sheet and the amount of the order.

As a general rule, the imposition man in charge of job forms is not supposed to know how to lay and impose large book forms, catalog forms or magazine forms. This class of imposition work is usually done in another department of the plant, by men who have had long experience in this work. However, the job man often finds it necessary to impose pages of matter for folders, catalog covers, pamphlets and small booklets, and such forms require a knowledge of margins, layouts, etc., on the part of the imposition man. The average four-page job, to be worked on a platen press, is made up and locked up in such a way that the sheet is first printed on one side, and then turned and printed on the other to complete it. This is called a "work and turn" job, and the four-page covers for catalogs, booklets and magazines are in most cases printed in this manner. Booklet forms of eight pages are also printed the "work and turn" way on a platen press. Folders are frequently printed as "tumble sheets" on a platen press: For example, an eight-page folder would have the pages imposed in such a manner that after a sheet has been printed on one side, it is turned over in a horizontal

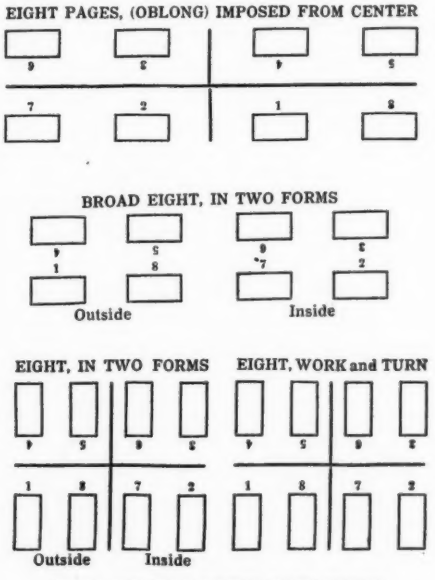


FIG. 1. TYPICAL EIGHT PAGE FORMS.

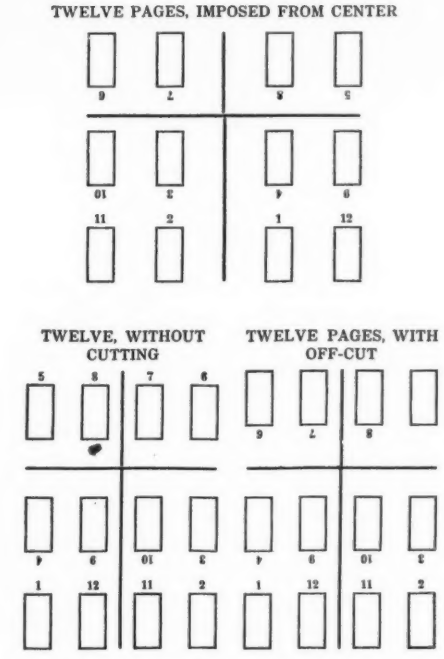


FIG. 2. TWELVE PAGE FORMS.

direction and is then printed on the other side. It should be understood that the stock is to be cut *double* the regular size for any form that is to be run either "work and turn," or as a "tumble sheet." This means that there will be *two* complete units after a sheet has been printed on both sides, the stock to be cut in half afterwards.

Many different jobs, other than cover pages or booklet forms, that are to be "backed up," or printed on both sides, can be worked either as a "work and turn," or a "tumble sheet," according to the sizes of the form and paper. When the sheet is of oblong shape it is convenient to handle it as a "work and turn," but when it is long and narrow it ordinarily should be printed as a "tumble sheet." These are technical points which sometimes must be decided by the imposition man, and it is well to remember that half the regular number of impressions is saved by either plan referred to here. For example, by locking up all of the pages for an eight-page booklet in a chase by having the stock cut double the essential size of the finished job; and, by printing the sheets on both sides from the same form of eight pages in the proper manner, two complete sheets of eight pages each are produced with only the two impressions.

In a rightly managed composing room the imposition man is not to lock up a form for press until he receives an "O. K." proof. On many occasions he will be called upon to make slight corrections in forms, as revised proofs are returned by customers, but in all such cases he should take another proof of the corrected form and have it passed by the proofreader before locking up the form. At times a pressman may ask to have a number of worn or broken type characters changed in a form, and after such corrections have been made another proof should go to the reader for "O. K.," before the pressman proceeds with the job. The imposition man should not be held responsible for typographical errors, or even for a form that may have been wrongly imposed, as the proofreader alone is responsible for such things. The rule is that when a pressman receives a form containing a number of pages, he must first take an impression of the form on a sheet of the stock and have the positions of the pages "O. K'd." by the proofreader before going ahead with the make-ready.

The modern imposition man uses various kinds of furniture in locking up job forms, including the regular labor-saving wood furniture, lead furniture, iron furniture, and in some shops, sectional steel furniture. The lead or iron furniture is often placed next to the sides of the form of type to be locked up, to make a square, solid form, but in most cases pieces of wood furniture are placed around the form with satisfactory results. By placing a line of lead or iron furniture between sections of wood furniture, a form is made particularly solid.

When locking up a job form of any kind, four pieces of wood furniture should first be placed around the form in the positions indicated by the following diagram:

With the four pieces of furniture arranged in this manner around the four sides of the form, there is no possibility of the furniture binding at the corners; the right amount of pressure can be applied at the top and side of the form to make it perfectly tight. The remaining space is to be filled in with wood furniture of the essential sizes.

In all cases of job forms the locking quoins should be placed at the top and right-hand side of the form.

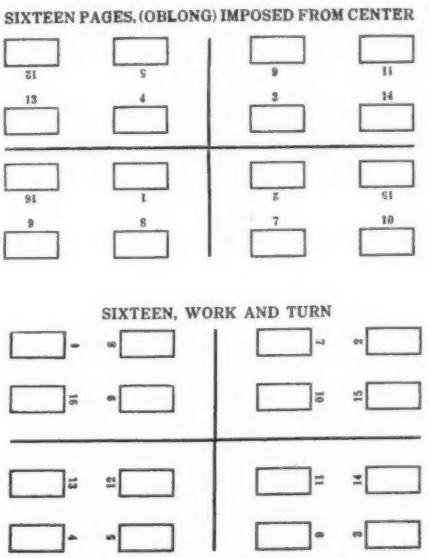
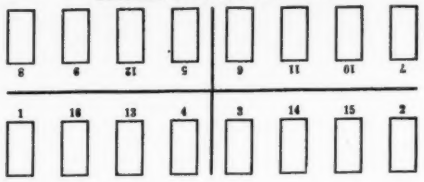


FIG. 3. SIXTEEN PAGE FORMS.

SIXTEEN PAGES, DEEP WAY



SIXTEEN PAGES, IMPOSED FROM CENTER

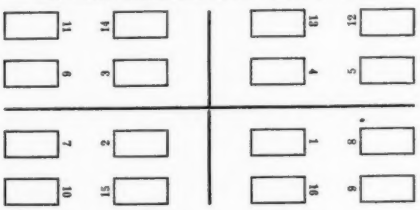


FIG. 4. SIXTEEN PAGE FORMS.

For the average small form two pairs of quoins at the top and two pairs on the side will suffice, but with larger size forms, 7x10 inches or more, three pairs of quoins should be placed both at the top and side. The quoins should never be placed directly against the inner sides of the chase for the reason that the metal-to-metal contact would not hold them tight. A piece of wood furniture should be placed between the quoins and side of the chase.

The careful imposition man keeps a supply of 6-point reglet in a drawer of the imposing table exclusively for use in connection with quoins; *i. e.*, on either side of each pair of quoins, and next to wood furniture, is placed a short strip of the reglet. By this plan the sides of wood furniture are protected from scraping, scratches and indentations which would be caused by the quoins were the pieces of reglet not placed as mentioned.

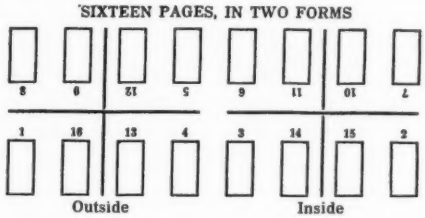
"Springy" forms, or those which rise up in the center after the lock-up, are of common occurence, and all of such trouble can easily be avoided as follows: First, near the bottom of the form between two lengths of furniture, should be placed a strip of heavy Manila paper about ⅛ of an inch wide. Second, another strip of the same paper and of the same width, should be placed at the left-hand side of the form between two lengths of furniture. Both of the strips of paper should be at the bottom of the furniture. The lock-up is then done in the usual manner, and it will be found that the form lies flat and level at all points. It would be a good plan for the imposition man to have a supply of the Manila paper strips ready for use.

Many forms which come to the imposing table are not of the most accurate justification, or have not been properly spaced for a tight lock-up, and thus the imposition man must ever be on the watch for such discrepancies. As a general rule, a few thin cardboard spaces, placed in the loose lines of a form, will overcome poor justification quickly, and will cause the form to "lift" perfectly tight. The imposition man would do well by cutting quantities of the thin cardboard spaces and keep them in a small case ready for emergencies. The most useful sizes are 6, 8, 10, 12, 14, 18 and 24-point, but each size should be cut slightly smaller than regular on account of the bur on the edges of the cardboard. The cutting can be done on a lead and rule cutter, from strips of the cardboard, using type quads to set the extension gauge to the required points.

Skeletonizing a form for close-register color printing should be done in such a way that each form of the series will have exactly the same blank spacing between lines and words. For example, suppose that a form of type and border is to be printed in three colors, and that the original form has lines of display type spaced apart with lines of 18-point quads, instead of with leads and slugs. The correct procedure would be to blank out the other two forms with the lines of 18-point quads, following every detail of the original form precisely. This will pre-determine accurate register, even in a case where outline type and border is to register over a printing of solid type and border. On the other hand, if one form was to be spaced with lines of 18-point quads, while the succeeding forms are spaced with leads and slugs, each form would have a different degree of "squeeze" in the lock-up, and there would be trouble in obtaining close register.

When close-register color printing and embossing are to be done from a number of electrotypes and dies, the set of embossing dies should be made up and locked up first, so that the pressman can take register sheets for the succeeding forms from the embossing dies. The use of a gelatine sheet in this connection will save a great deal of time for both imposition man and pressman. An impression of the set of embossing dies is taken on the gelatine sheet, in black or any other color that happens to be on the press. The imposition man then

SIXTEEN PAGES, IN TWO FORMS



EIGHTEEN PAGES, WITHOUT TRANSPOSITION

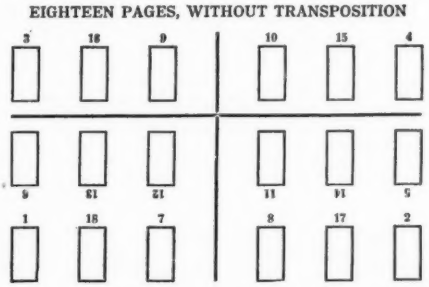


FIG. 5. SIXTEEN AND EIGHTEEN PAGE FORMS.

uses this gelatine sheet when making up the sets of color plates for the same job. By placing the gelatine sheet containing the impression of the embossing dies over a set of the color plates to be locked up, and by employing the gelatine sheet as a gauge, the imposition man can move the plates into exact register with the embossing dies, and lock up the form accordingly. The chase containing the embossing dies is kept standing for use after all of the color forms have been completed, and until the printed sheets are ready to be embossed.

The work of locking up forms to be electrotyped generally falls to the lot of the man having charge of the imposition of job forms, and there is a way of handling this class of work systematically so that it can be done rapidly and to the best advantage for the purpose. The careful imposition man will arrange to have a liberal supply of electrotype base, cut to standard labor-saving sizes and kept in a slug case ready for immediate use. This special base should be placed around every form that is to be electrotyped, and whenever possible, the form should be locked up in a regular electrotype chase imprinted with the name of the printer. If there are no such chases in the house, an ordinary chase may be used instead, but the electrotype chases are to be preferred owing to their strong construction.

Forms that are sent to an electrotype foundry come back to the printer rather dirty with moulding graphite, and for this reason it is advisable to have in the composing room a separate rack of furniture to be used only for the lock-up of forms for electrotyping. An assortment of worn furniture will serve this purpose. When the forms are returned from the foundry they should be first scrubbed with a strong solution of lye, to remove the graphite, and then should be rinsed with pure water.

All of the various kinds of furniture used in imposition work—wood, lead and iron—come in a wide range of labor-saving sizes, and can be bought in single pieces, fonts, or in special fonts placed in cabinets made expressly for the purpose. The cabinets can be purchased with or without the furniture.

(To be concluded)

BRITANNIA METAL — VII.

The Turned Candlestick

Professor William H. Varnum, University of Wisconsin.

"If the past has done so much and so well, shall we with such a heritage do less and fail?"—C. Howard Walker.

Its Historic Significance

THE Butcher, the Baker, the Candle-stick Maker," runs the old rhyme. The candle in some form is as old as civilization while the story of its evolution is full of interest. The origin of the first primitive candle is vague. Biblical history brings to us knowledge of the skill of metal workers of that day; the superb seven-branched candelabrum of the Temple of Jerusalem, the oil-fed golden lamps, but little is written of the candle as we know it.

The torch-like lamps or candles of the Romans and Greeks have supplied our symbol of knowledge, but the first information of true candles comes from the Third Century, when, as a valuable accessory to church services, its gleam lent impressiveness and solemnity to the ceremonies.

Candlemas Day, a religious institution of the Fifth Century is accredited with the introduction of the candle and stick. This festival, created in commemoration of the presentation of Christ in the Temple, was celebrated by a procession of the clergy who blessed and distributed candles as symbolic of the light of Christ.

"On Candlemas Day
Throw candle and candle-stick away."

Referred to the custom of discarding old and using the newly blessed candles for the ensuing year; which seems costly but for the following reason. The word "candle-stick" gives us a key to it as the early form in use at that time consisted of a wooden stick upon the point of which they impaled the candles, making the custom an inexpensive form of devotion.

With the growth in magnificence of church services, it is easy to see how metal candle-sticks would naturally displace these simple wooden affairs. The design of these metal candle-sticks was simple; a column or shaft surmounted by a "pricket" or sharp point for retaining the tallow candle; a saucer around the shaft for the drip.

English religious persecution which culminated in the Sixteenth Cenutry by the abolition of Candlemas Day as a "papist institution" naturally curtailed the use of candles. Furthermore, superstition attached to the old "pricket" candle-stick hastened the introduction of a new form similar to modern patterns. This late Sixteenth Century pattern was similar in that it had a *socket* for the candle, a short, fluted column with a square base, provided with a circular depression for the drippings or a circular protective plate for ease in transportation.

The first illustration in Plate 1 shows a modification of this type as expressed by a Jacobean pattern of the early Seventeenth Century. With its simplicity of construction, severity of form, heavy proportions, and straight lines one feels a complete harmony with the furniture of the period.

Through the Dutch predelictions and tastes of William the Third and Mary, we find a complete change of spirit, more or less suggesting the turned legs and

fluting of the furniture of the time. Need I say that the design shown in Plate 1 pertains to silver; and its design would need considerable simplification in its transmutation to pewter. To understand this, study the 1698 pattern and a later translation in the lower left-hand corner of Plate 1. The spirit remains the same, but details and curves show considerable modification.

At the beginning of the Eighteenth Century, and with the advent of the Queen Anne style, simple and plain designs became the fashion with practically no surface enrichment. A distinct departure from previous forms came through the introduction of the baluster shape in the shaft or stem. The baluster shape, also seen in the broad splats of the chairs of the period is shown in the graceful swelling or enlargement of the stem as shown on Plate 1. The bases of the Queen Anne style were usually square with the corners cut off, giving a semblance of an octagon, the whole presenting a finely proportioned and subtly curved design. It is

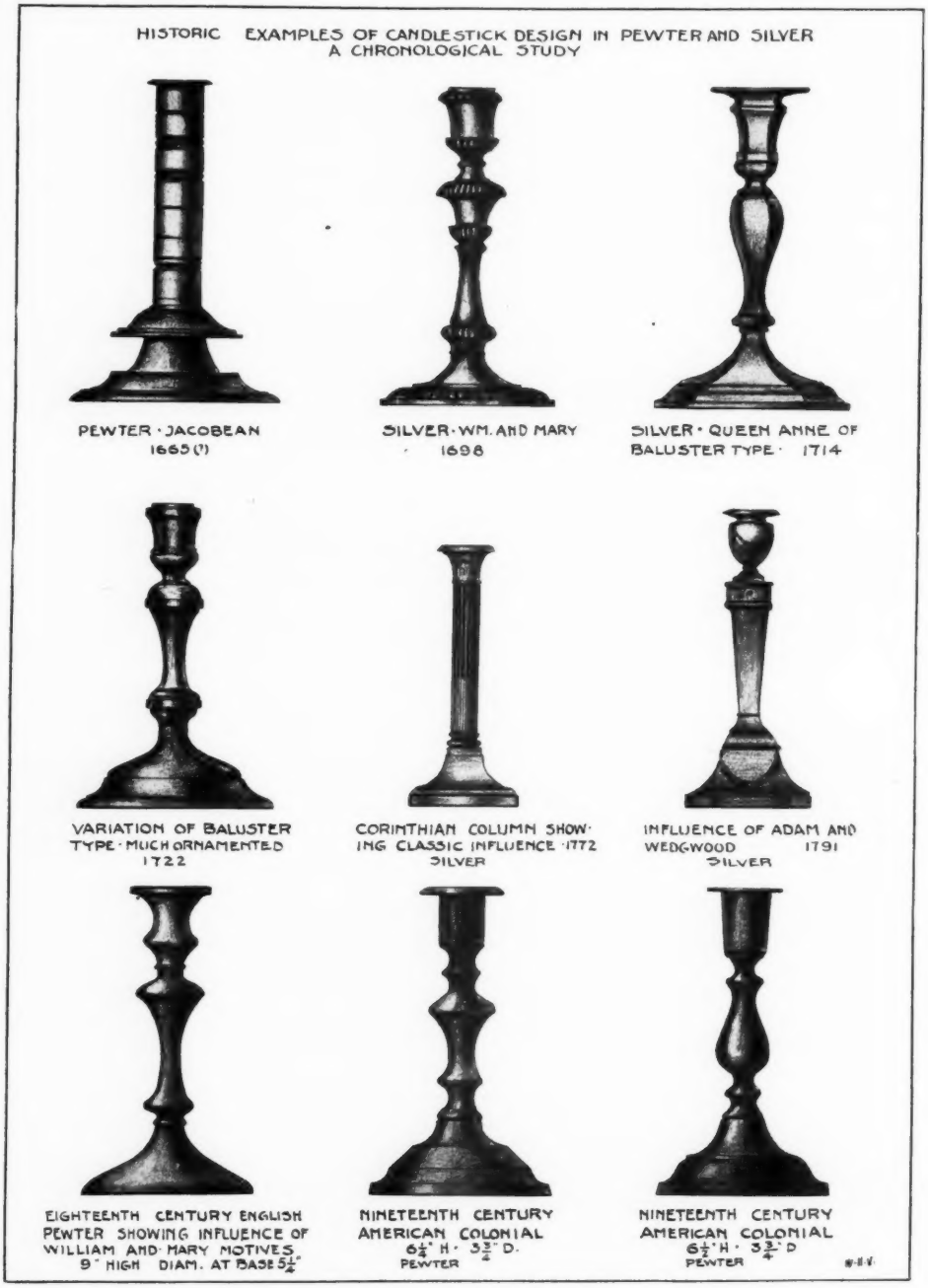


PLATE I.

interesting to associate Walpole, Pope, Addison, the artists Reynolds and Hogarth with this period, to imagine them as living and working under the rays of candles placed in sticks of similar Queen Anne patterns.

Unhappily for simplicity designers began to add underlying form for over-decoration. Some patterns of this transitional period were plain with square bases and rounded corners but the highly decorated styles were usually provided with round bases as is the case with our illustration.

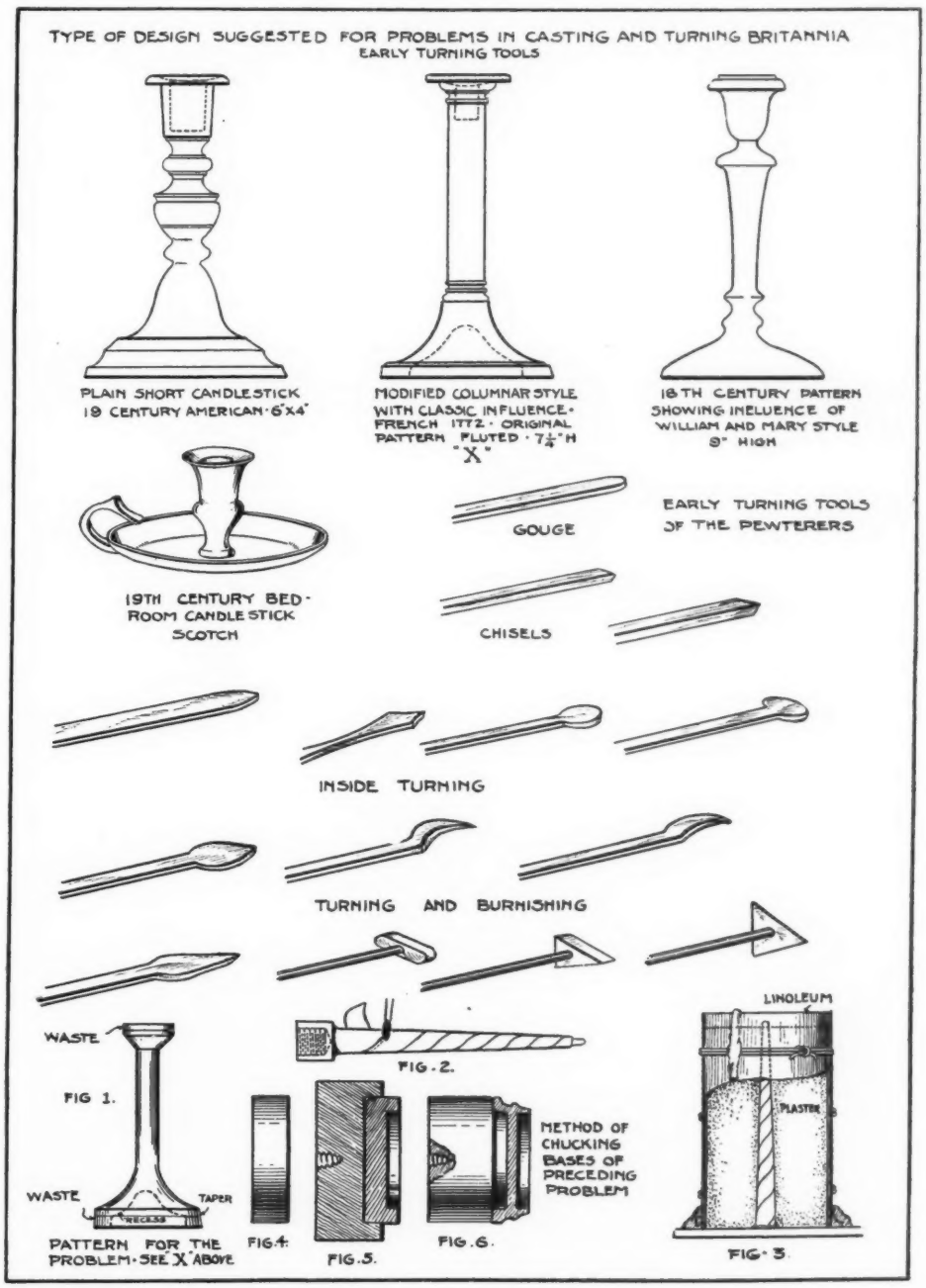

TYPE OF DESIGN SUGGESTED FOR PROBLEMS IN CASTING AND TURNING BRITANNIA
EARLY TURNING TOOLS
PLAIN SHORT CANDLESTICK 18 CENTURY AMERICAN · 6"X4"
MODIFIED COLUMNAR STYLE WITH CLASSIC INFLUENCE · FRENCH 1772 · ORIGINAL PATTERN FLUTED · 7¼"H "X"
18TH CENTURY PATTERN SHOWING INFLUENCE OF WILLIAM AND MARY STYLE 9" HIGH
19TH CENTURY BED-ROOM CANDLESTICK SCOTCH
GOUGE
EARLY TURNING TOOLS OF THE PEWTERERS
CHISELS
INSIDE TURNING
TURNING AND BURNISHING
WASTE
FIG 1.
WASTE
TAPER
PATTERN FOR THE PROBLEM · SEE "X" ABOVE
FIG. 2.
FIG. 4.
FIG. 5.
FIG. 6.
METHOD OF CHUCKING BASES OF PRECEDING PROBLEM
LINOLEUM
PLASTER
FIG. 3.

PLATE II.

scrolls, flowers, and other Louis Fifteenth devices to the sticks, designs became heavier and much simple beauty was lost. Our illustration shows a transitional type wherein the William and Mary influences (which lasted through the reign of Queen Anne) served as the

Near the middle of the Eighteenth Century, revival of interest in the classics led to the introduction of the fluted Corinthian column as a motif in candle-stick design, illustrated in Plate 1. Towards the latter part of this century, further development of the classic idea

replaced the Corinthian column by a square stem tapering towards the base and terminating in an urn-shaped socket. Festoons of vines and leaves formed surface enrichment, much to the detriment of an attractively designed contour. The same types of surface motives, but more appropriately applied are to be found in the contemporary Adam furniture of the period or in the pottery products of Josiah Wedgwood. Curiously enough, for the first time we find removable candle sockets introduced in this epoch. Contemporary pewterers followed closely the designs of the silversmiths, their best designs showing true translations of silver motives into lines fitting the softer pewter.

Candle-stick design of the Nineteenth Century repeated with slight variations, the styles I have enumerated. American silver and pewter followed contemporaneous English styles as will be seen by reference to the two remaining cuts in Plate 1. The middle illustration in the last row is permeated with William and Mary influences in its shaft, with classical tendencies in the modeling of the base and socket. The last one has the baluster pattern of the Queen Anne style, likewise possessing classical traits of the previous century with relation to the mouldings, eclectic blendings which seem to lend a peculiar beauty to American colonial pewter.

Designing the Problem

In designing a candle-stick, it is well to bear in mind the parallelism between an architectural column and the stick in which pedestal shaft, and socket follow closely the constructive design of the cap, column, and base of the classic form. As in architecture, the problem resolves itself into questions of (1) proportions and (2) coordination of the pedestal, shaft and socket by delicately graded curves or contours.

The designer should avoid the fault common to many old candle-sticks in which an over-heavy base resulted in clumsy proportions. Possibly a desire to make the base sufficiently heavy for utility led to the error. The lower row of designs in Plate 1 and the top styles on Plate 2 will give an idea of relative proportions which have proved satisfactory.

Contour curves function to unite the horizontal planes of the base with the vertical spirit of the column, later to join the column and socket. The feeble and abortive effect of two compass curves used to join base and shaft (an error common to modern school and ancient practice) must be avoided in favor of more subtle curvature and deeper mouldings with their varying shadows; for it is by these shadows that the candle-stick stands revealed and whatever beauty there is in it made manifest.

To join the pedestal and shaft, two methods may be used: long curves in contrasting directions (Eighteenth Cenutry designs in Plates 1 and 2), or a series of smaller curves representing both continuity and contrast as depicted by the last candle-stick in Plate 1.

The shaft may be either plain or curved, provided the curves are so grouped as to show one dominant or major curve supplying character to the design. The minor curves are to be so planned as to give either marked contrast and deep shadows or be in complete continuity of curvature; moreover the curves must be adjusted to the hand. One usually grips the stick by its shaft, but upon occasion this is varied as in the short candle-stick of Plate 2 wherein the hand rests on the long curve of the base. Usually one finds a deep shadow directly under the socket, with a series of smaller curves varying the shadow and supplying an interesting connection between shaft and socket. One may study the Doric column with advantage, for its moulds are quite appropriate to pewter designing.

Unity of design is emphasized by a repetition of similar curves throughout the design, retaining in mind the precept of Britannia design, robustness plus delicacy. While in these articles, the need of explicit explanations calls for the development of an arbitrary design, it is clear that *exact copying* of the pattern I have suggested is a valueless pursuit and out of sympathy of the art-crafts movement. To avoid the need of direct duplication, I have supplied sufficient illustrative material from which one may create his own motives in the spirit of the school which appeals to him.

For our problem, I have selected as simplest, the modified French columnar design in the center of the top row in Plate 2. This is based on the 1772 Corinthian column from which the objectionable features of fine detail and flutings have been removed as technically too difficult for beginners.

The Tools

Five hundred years have made little difference in the shapes of the turning tools used by the ancient pewterers. In Plate 2, the more common types are illustrated ("Pewter Plate" by H. J. L. J. Masse), many of which are similar to the current wood turning tools. The burnishers of steel with the highest possible polish are for imparting the smooth finish to turned surfaces. All of the tools may be made from tool steel, while as the emergency arises, more tools may be added to the collection.

Scraping cuts are in bad form for wood turning, but are allowable and customary in Britannia technic. Certain tools are used for both turning and burnishing as in the case of the first one in the lower row, the spear-grater or burnisher according to its use. The remaining three tools or hooks in the lower row are used in a manner peculiar to themselves, namely, by holding them *under* the tool rest and thus against the lower side of the rotating metal. As is normally the case, the remainder of the tools are placed above the rest. Old pewterers' tools had abnormally long handles with which sufficient pressure for burnishing could be applied.

A low speed becomes necessary in turning and burnishing. As the heat generated by the burnishing process causes the Britannia to adhere to the tool, it

becomes necessary to lubricate the work with soap and water.

Turning Pedestals and Bases

At this point, let me digress to explain methods of completing the bases of cups and other containers mentioned in Article VI in the February number of the INDUSTRIAL ARTS MAGAZINE. In the direction of practicable school methods, I have soldered both handles and bases to the bodies of the problems. By duplicating this, the ancient pewterer would have been involved in all sorts of trouble with his guild, whose laws required one piece casting, an extremely elaborate type of mould construction.

For forming the bases of Article VI, cast a cylindrical blank exceeding slightly the greatest diameter of the desired part. (Figure 4, Plate 2.) Attach a piece of wood to a screw face plate, true into cylindrical form and cup out the outer end into which is forced the metal blank. With the gouge and chisels hollow out the base of the Britannia blank and true the bottom (Figure 5). Remove the base and turn the same piece of wood down to the point where it may be tightly fitted into the hollow in the base. (Figure 6.) Complete the contours and recess the top of the base as illustrated, into which may be fitted and soldered the metal cup or other form. One must keep in mind the fact that there is a large amount of delicate design concentrated in a small space in this base. Many variations of this simple chucking plan will suggest themselves as the lines and character of the base change.

Preparing the Candle-stick Pattern

Resuming the construction of the candle-stick heretofore mentioned (X on Plate 2) one should prepare a simplified pattern. Allow one-fourth of an inch at all points for turning, three-eighths at the bottom and one-fourth of an inch at the top for waste. This pattern may be made of wood but preferably from plaster, which when well shellaced and oiled turns perfectly.

The best method is as follows: prepare a tapering steel mandrel, Figure 2, with one end threaded to fit the head stock of a wood turning lathe and two inches longer than the candle-stick pattern. Wrap stiff paper around the mandrel, and glue at its overlapping edges, producing a tapering tube which, when dry, may be slipped from the mandrel.

Wrap linoleum into a cylindrical form slightly exceeding the external diameter of the pattern; by means of clay or plastelene seal it tightly to a flat surface of tin or glass. Place the tapering paper tube in the exact center of the linoleum roll, fasten with a bit of clay and cast a plaster cylinder as directed in the previous article. When the plaster is set, remove it from the linoleum and slip it on to the tapering steel mandrel upon which it may be turned with the usual lathe tools or with the pewterers' outfit. A well-shellaced tapering hardwood stick, sufficiently long to be held between head and tail stock, may be substituted for the mandrel.

When turning, allow sufficient space between the pattern and the head stock for the entrance of a tool to recess the base for chucking, as seen by the dotted line in Figure 1.

(To be continued)

MACHINE SHOP, LACONIA HIGH SCHOOL, LACONIA, N. H.

INDUSTRIAL-ARTS MAGAZINE

E. J. LAKE S. J. VAUGHN
Editors

EDITORIAL

IMPROVEMENT IN SERVICE

Few teachers have reached the point of superior skill in teaching. About the time a teacher feels that he has acquired sufficient skill and information to rank him as an artist in teaching, new discoveries are announced, new fields of investigation are opened up, and new principles and methods are proposed.

The teacher who feels that he has finished his education is already a back number. Eternal study, investigation, adaption and adjustment are the price of progress.

If it is important for teachers of long service to be reminded of this fact, how much more important it is for teachers who have only recently come into the work from the trades or other professions.

Much can be done by supervisors, superintendents, and principals by providing courses of lectures or studies for their teachers. One of the greatest services the state universities and similar institutions have ever rendered is their plan to conduct extension, or extramural courses for teachers in service. Such courses have been of untold value to those who have lately come into the teaching profession, as well as to those of longer experience.

The teacher-training courses offered for prospective teachers of part-time or continuation classes revealed some striking things. One most interesting thing revealed was that teachers in the regular school work did not realize the necessity for special training in order to take up successfully the duties of part-time or continuation school teachers. After being pressed into training classes, such teachers, if they showed any signs of promise whatever, gradually come to see the new point of view. They soon found that their accustomed teaching en masse must give way to individual instruction, at least partially. They learned that organized, cut-and-dried courses of study were not the all important consideration in dealing with working boys and girls with a great variety of industrial experiences and educational needs. They learned that the question of discipline and control was essentially different from that of the regular, full-time day pupils. Then they became enthusiastic students again seeking every possible avenue of information and assistance.

Training in service has frequently transformed an unprogressive third-rate school-keeper into a wide-awake, progressive, successful teacher. The greatest and most difficult work in the educational world is the training of teachers. So many teachers enter the profession with such inadequate preparation that every possible effort should be made to give them an opportunity to improve themselves while they teach. Every possible encouragement should be given by those in authority to after school classes, evening classes, Saturday classes for teachers and to such correspondence courses as will bring improvement to teachers in service.

WHAT'S IN A NAME?

A discussion under this topic concludes with this statement: "So we see that such terms as Manual Training, Industrial Arts, Vocational Education and kindred terms are terms of well established meaning. If we familiarize ourselves with the correct meanings of each of these terms and exercise a reasonable amount of care in using them, much needless misunderstanding and aimless discussion will be avoided. If we who are directly interested in the fields of education designated by these terms fail to hold to the meanings which clearly exist, we may well ask who, under the shining stars, is going to preserve these distinctions?"

The clearest conception we have with regard to the various names under which instruction in The Industrial Arts are conducted is their comparative significance of vocational and cultural purpose.

The industrial arts involve both vocational and cultural purpose.

If it were not so we would change our name and we see no reason for narrowing the field of our interest to one or the other of these purposes because the instruction of one class is predominantly vocational and another class is predominantly cultural.

As to preserving distinctions by name we have little faith.

Our interests are not even confined to school interests but they are confined to educational interest. The term Education need not be added because we prefer to have that purpose taken for granted.

The distinction of purpose should be secured by the method in all educational procedure. A good name implies a definite purpose and we believe The Industrial Arts implies the distinctive purpose of developing boys and girls in school and out of school through the study and practice of Industry and Art.

PROSPECTS OF SPRING

A characteristic letter from William H. Vogel, President of the Western Arts Association, holds in prospect a strong program for their meeting at Dayton, Ohio, in May. President Vogel and his Committee have secured enough talent in the industrial arts to warrant every school board of the Central States in sending a representative to this meeting with expenses paid.

The fact that Dayton is centrally located in this territory and that the city is rich in the interests peculiar to teachers of The Industrial Arts will in all probability make this a meeting of record attendance with the Western Arts Association.

Incidentally the roads are well paved over that way and gasoline is not prohibitive in price. Let this be a suggestion to the mechanical genius who not only

needs to confer with his fellows but may well indulge in a well-balanced program of industrial interest flavored and mellowed to a proper educational consistency with the arts.

SHALL VOCATIONAL EDUCATION COMPETE WITH PRIVATE INDUSTRIAL ENTERPRISE?

The era of industrial education has arrived in the United States, and is daily gaining in momentum and strength. In the course of its inauguration and development, it has been subjected to modifications as to scope and operation, and adjusted from time to time more nearly to local needs and requirements.

That the adjustments are by no means complete, and that a firmer grasp, as to the possibilities of useful service, is yet to be secured, may reasonably be expected. Thus, conditions which require care and caution may arise momentarily. No innovation in the field of education is entirely free from experimental considerations, and if vocational training has not found itself in all its ultimate uses, it is because the study is comparatively new as an accepted part of our system of education.

We said something about care and caution. Here we have in mind situations which arise occasionally, not so much within the field of vocational training as such, as in the relations which that field of education bears to the industrial life of the country.

For instance, the attitude which vocational training assumes towards the cause of industry itself, is that of cooperation and helpfulness. That is recognized and understood. Can any situation then arise which violates that attitude and which could be resented rather than welcomed by private industrial enterprise? If any dissatisfaction has arisen thus far, it has been because vocational training has not done all that was expected of it, rather than that it has overdone its own task.

But, there are instances where vocational training has offended private enterprise by placing itself in a competitive rather than cooperative attitude. Numerous cases may be cited. For instance, it is told that the vocational department of a city high school expanded its automobile repair services to the general public to a point where several neighboring repair shops had to go out of business. Thereupon the automobile interests forced the vocational school to go out of the automobile repair business. And other instances have come to light where a vocational school engaged in the millinery business on a highly competitive basis with the result that the local milliners prevailed upon the board of education to trim the business aspirations of the millinery department of the high school.

While the cases cited here may be deemed to be purely local and incidental, they note, nevertheless, a tendency and a danger line. The taxpayer who supports the school does not want that school to interfere with his business. The moment that vocational training seeks to placate industry rather than serve it, that moment it has gone beyond its generally accepted function and has invited opposition.

This by no means argues that the useful things produced in a vocational school should go to waste. In fact, all serviceable things produced in the regular course of training should find their place in the economies of life. Nothing should be wasted.

In some of the larger cities, the output of the vocational schools runs into handsome figures, but in comparison with the industrial production of the community as a whole the output is nevertheless nominal. Realizing that in the process of vocational training a by-product is achieved which must be marketed, the manufacturer does not mind the nominal competition. Besides, the modern manufacturer believes in the elimination of waste.

The question which naturally arises here is whether production should be engaged in for the sake of production, or for the sake of training. The answer is obvious. And if in the natural course of such a policy articles are produced or service is rendered which lend themselves to purchase and hire, for monetary consideration, then no merchant or manufacturer can reasonably object.

The cause of education must have the right of way, and the broader purposes of vocational training cannot be obstructed by petty selfishness and small fry interests. The by-products of that training are minor, to say the least, but should not be subjected to waste. At the same time vocational training must function within its recognized scope, and maintain a cooperative rather than competitive attitude towards industry.

BAD LETTERING

Really good draughtsmen are scarce. The development of skill in drawing seems to be usually a slow and laborious process. Especially is this true of lettering. It is no uncommon thing to see good drawings spoiled by bad lettering.

Perhaps the system of teaching so long in vogue has had much to do with faulty lettering. There are those of us who were brought up on the plate-copying system of drawing. In such a system, the student copied slowly and painfully a plate of A's, then a plate of B's, etc., each time trying to get each letter perfect before proceeding to the next, so that the plate would be ready for the teacher's inspection.

Skill comes from intensity of attention and frequency of repetition. Facility in drawing and lettering may be acquired more readily by a rather free and rapid repetition of the strokes and the letter forms than by the cramped exercises that almost invariably result from the slow and laborious formation of the characters for the teacher's inspection.

It has been found to be a good plan to have students make several quick and temporary "plates" that readily find their way into the waste basket, before making the more pretentious effort for inspection and preservation.

It is to be hoped that some method may be devised whereby high school boys may learn to do lettering that in some measure equals their skill in the drawing proper.

The Orange-Crate and Candy-Bucket Bird House

C. Anthony Van Kammen

Article No. 2

The second type of bird house in the series is constructed from two candy buckets—to be more exact one and three-fourths—and, though not much more difficult of construction, involves more work. The buckets are used in an inverted position, and the partitions for either two or four compartments are 8" deep; i. e., the floor will be 3" from the lower edge of the bucket containing the rooms. The perimeter of the lower bucket is divided into eight divisions. Five-eighth inch holes are bored at these places, 1½" from the edge, and points or lobes are cut on the edge with a compass saw. See illustrations.

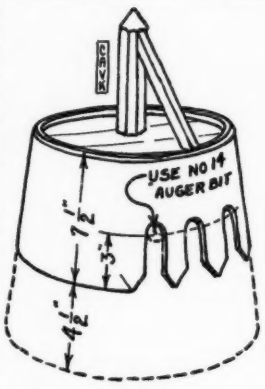


FIG. 1.

The body of the house is now ready for the crown which is made from the second bucket after 4½" have been cut off from the rim. Save the portion cut off and see that all the sections are marked or numbered as they will be used in the construction of the martin house described in the next article. Divide the edge of the tub-shaped portion into sixteen parts. Bore holes at each division with centers 3" from the perimeter. Draw lines tangent to the holes and perpendicular to the edge. Saw on the lines to the holes, and the ⅞" sections will come out. Cut points on the ends of the fingers formed, and the crown is ready to slide on to the smaller end of the first bucket. (See figure 1.) Make sure that it is on straight and nail in place. Locate and bore the entrance holes in the body of the house suitable for the tenants desired. Wrens, ⅞". Bluebirds, 1½".

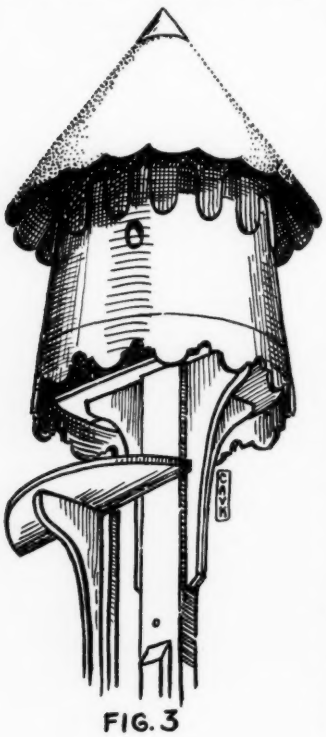


FIG. 3

When placed on a post either of two methods of putting in the supporting base are used. In the first method a circular built up floor the exact diameter to slip inside the bucket up to the partitions is made and attached on the end of the pole. Brackets or braces are made and fitted under the circular base to the post. Four screws or nails driven part way into the edge of the floor from the outside of the house secure it in place. To clean the compartments, the screws or nails are withdrawn, and the structure is lifted from the floor. (See figure 2.)

The second method of construction is to fasten a strip 4" wide, made of two pieces of crate-end material, end to end at the center, as part of the floor. From crate ends pieces are then sawed out to fit in on each side to complete the floor. The 2"x4" post is nailed in position with its broad sides parallel with the center strip and a bracket is fastened on each side. The other two brackets are nailed to short removable sections of the strips nailed to the 2"x4" post mentioned in article No. 1, and also to the semi-circular floor sections. The strip sections, with brackets attached, fitted to the pain part on a miter. (See figure 3.) With the floor sections in place, one screw in the removable strip will hold them there. To clean the house, withdraw the screw and the section can be taken out.

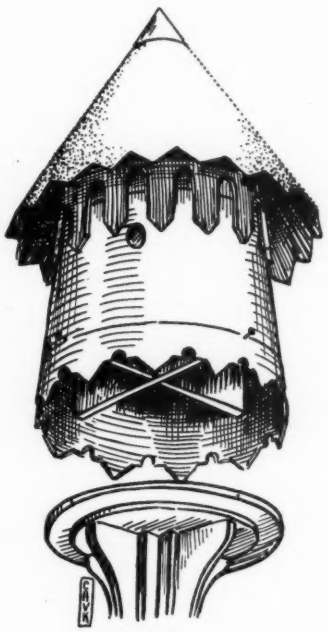


FIG. 2.

Chamfer the top edge of the crown to which the shingles are to be nailed. Make and fasten in place the center supporting shaft for the roof and also the strip for reenforcing the shingle where the roofing seam is to be nailed. (See Figure 1.) Do not forget to mark the location of the latter or difficulty will be encountered when attempting to nail the roofing seam. Cutting the shingles and roofing and putting on the copper peak are done the same as suggested in the previous article. If the house is to hang, the floor is made as explained for the post first method, figure 2, the small circular piece downward.

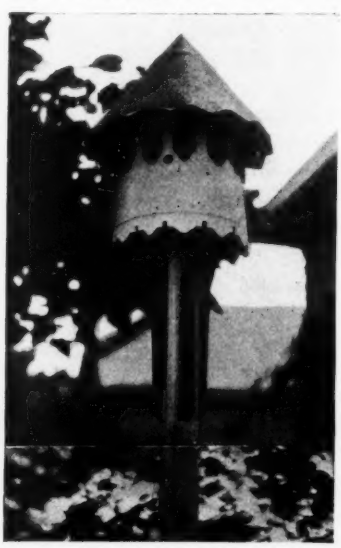


FIG. 4.

FIG. 6.

FIG. 5.

Either a ring or a pendant can be attached as in the case of the first bird house.

Figure 4 shows a completed wren house. Figure 5 shows a hanging type under construction and also a four-room martin house the subject for the next article. Figure 6 shows another design with cupola ventilating shaft. This house was occupied by bluebirds six days after the house was set out.

DECORATIVE EASTER CARDS

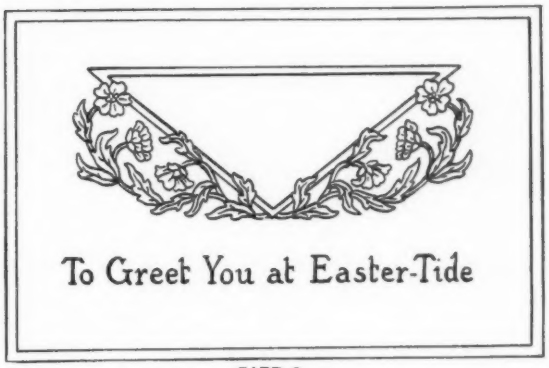
D. Elizabeth Roberts, Philadelphia, Pa.

Very attractive Easter cards can be made by using colored cardboard, or heavy art paper, as a frame for a small print. An appropriate decoration around the print adds to the attractiveness of the card, and affords much opportunity to the handicraft worker for originality.

The card with the oval panel and the words "Best Wishes for Easter" was made with a foundation of brown cardboard, measuring 3¾x5¾ inches. The design of forget-me-nots and the wording were done on heavy cream-colored paper, which measured a trifle less than the cardboard. The design and lettering were first outlined with India ink. Then the decoration and initial letters were tinted with water colors, blue and green for the flowers and leaves, with the border in brown and the initial letters the same color. The oval opening was cut out with the scissors and a brown-toned print pasted beneath it on the cardboard. Then the cream-colored paper was mounted over the cardboard, so that about an eighth of an inch of the brown showed around each edge.

The two cards with the wording "To Greet You at Easter-Tide" and "Glad Easter Tidings" were the same size and made in the same manner as card No. 1. For the one with the triangular opening, dark-green cardboard was used as a foundation with cream-colored paper mounted over it. The design of buttercups was colored

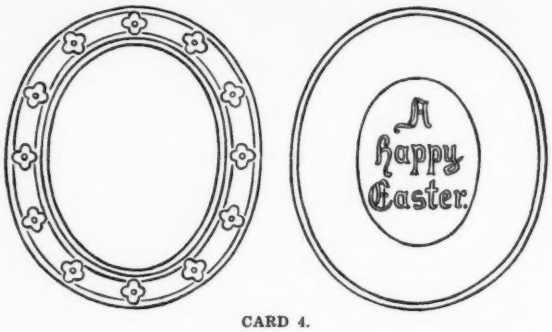
CARD 1.



CARD 2.

CARD 3.

CARDS 1, 5, AND 2.



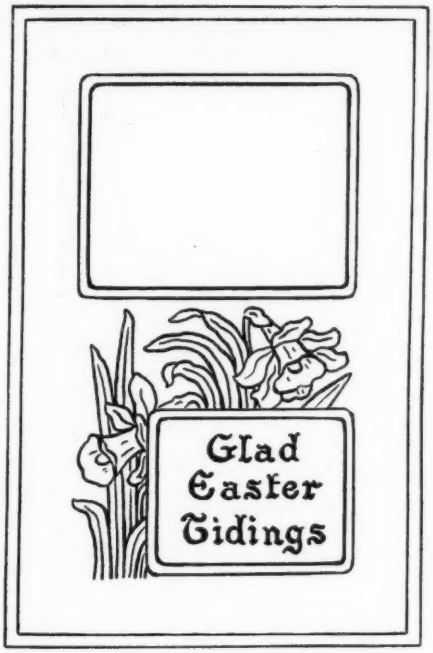
CARD 4.

yellow and green with a bluish-green border around the print, which was tinted with water colors.

The card with the words "Glad Easter Tidings" was made of cardboard of a dull rose color, the design being done on heavy white paper The daffodils were a bright yellow and the leaves two tones of green, the borders around the picture and lettering being tinted a rose color. A small print of Corot's "Spring" was mounted beneath the opening.

The oval card was made of two pieces of light gray cardboard. The oval print of the choir boys was first mounted on a piece of dark gray cardboard, a little larger than the print, and this was then mounted on the light cardboard. A conventional design in violet color decorated the frame around the picture. The other piece of light gray cardboard had the words "A Happy Easter" painted in the center, using violet for the lettering. The two pieces were tied together with narrow violet ribbon, which would also serve as a hanger.

CARDS 4 AND 3.



CARD 5.

The card with the words "An Easter Greeting" was made of brown cardboard and heavy cream-colored paper. The cardboard measured 4¾x3⅞ inches. and a brown-toned print was mounted in the center of this card. The cream paper was cut a little smaller than the brown card, with an opening in the center, measuring 2⅝x3½ inches. The design and lettering were placed on this narrow border, the flowers colored yellow and the leaves two tones of green, the initial letters being in yellow and the other letters green. Both design and letters were outlined with dark brown. A narrow green ribbon was used to tie the two pieces together.

These Easter cards make a good problem for the classroom, for an endless variety may be made by using this idea of a decorative framework around a small print. If the print is of a gray tone, tinting it with water colors usually makes it more attractive, and even prints of a brown tone are often improved by some delicate coloring.

A Better Way to Turn Built-up Projects

A. M. Hahn, Instructor in Wood Turning, James Millikin University, Decatur, Ill.

In our teaching of the industrial arts we are prone to put much stress upon "standard practice" and "conventional methods," and we are entirely right when we do so. However, too often we lose sight of the fact that our own individual method may not be the only one or necessarily the best one. For years the making of candlesticks, lamps, pedestals, fruit bowls, and all built-up turning projects has been after a fashion which I believe can be improved, in spite of the fact that it is accepted as the conventional method almost universally.

For the purpose of comparison, a brief outline of the present method of turning a lamp is not out of place. First, either the base or column is made as near like that part of the design as possible, and sometimes it is turned, sanded, filled, finished and polished before the other part is begun. When the two parts are completed, they are assembled by gluing the column into the base. If the student is of the A class, he may manage to keep the glue where it belongs instead of spoiling the polish. The column may stand vertically instead of at an angle as is sometimes the case. When the glue has dried sufficiently,

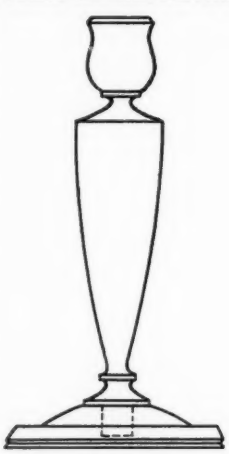


FIG. 1.

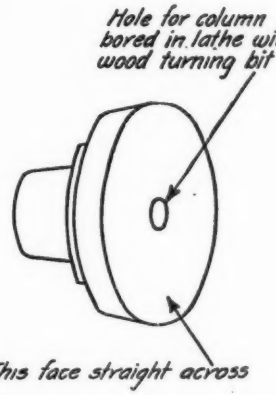


FIG. 2.

a hole is drilled through the column for the electric wires—a process which is ticklish if the column is slender, or if the grain of the wood is anything but straight. And here again is a chance to spoil the polish. So much for the present method of turning a lamp.

Now, the better method of making built-up projects is not an innovation but is in reality only a reversal of the present system. Because wood turning is taught in so many schools, detailed descriptions of the turning of a lamp and a fruit bowl are justified. As for the lamp, the first thing, of course, is the design. Fig. 1. Next, the base is prepared in the rough on a face plate as in Fig. 2. It will be noted that the hole for the column is bored with a wood turning bit, in the lathe. This insures a true, cylindrical hole—a thing which requires no small amount of skill when done with the small skew tool. Observe too, that the upper part of the base must be a flat surface, at least near the center, in order to obtain a good glue joint between the base and column.

The column, Fig. 3, is now turned to a rough cylinder with a square shoulder and accurately sized end to fit the hole in the base. Next, a hole for the electric wires is drilled through the column, after which it is glued into the base. With the addition of a hardwood plug in the upper end of the drilled hole, the lamp is ready for turning, sanding, filling, finishing and polishing as one unit. Upon completion, the removal of the hardwood plug is a simple matter. Fig. 4 shows how the assembled parts appear in the lathe, and gives an idea of the ease with which the whole design may be accurately followed.

In Fig. 5, the same method is applied in the making of a fruit bowl. The small knob at the dead center is easily removed after the rest of the piece is sanded; then the polishing is all done with the face plate as the only support.

Now, for the advantages of this method over the old one, let us compare the following:

In the Old Method	In the New Method
1. Design is worked up in parts. Hard to make continuous curves, etc.	1. Whole design is worked up at one time.
2. Hard to assemble base and column at right angle.	2. Base and column must be at right angle, because the project is turned as one unit.
3. Much time is lost in finishing each part separately.	3. Time is saved, because all finishing is done at once.
4. Finish may not be the same on all parts, due to finishing separately.	4. Finish bound to be the same all over, because all parts are finished at one time.
5. Polish may be spoiled by glue, or by heat generated in drilling holes, etc.	5. Polish will be in good condition, because polishing is last thing done.

And last, and most important from a pedagogical point of view, is the feature of doing all of the fitting, drilling and gluing before the project is so near finished that a boy will be hopelessly discouraged if he spoils his highly prized work by a poor job of assembling.

MR. SUPERINTENDENT!

H. E. Stone.

In recent years tremendous progress has been made in methods and devices for measuring individual abilities and for determining individual aptitudes. Are the boys and girls who are under your control and management receiving their rightful share of these tools of human progress? Are their likes and dislikes being turned into assets or liabilities in your "system?"

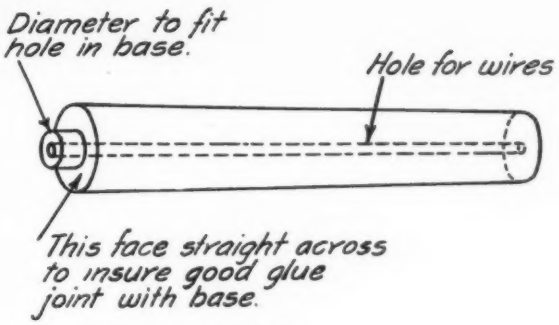


FIG. 3.

How much helpful information dealing with human capacities and limitations and with the world's opportunities and requirements is placed at the disposal of your boys and girls who apply for "working papers?"

How much information about the relative opportunities of the large college and the small college does your "system" provide for those who complete the high school course and desire to continue their education? To what extent are your high school teachers equipped to guide them in the intricate but momentous decisions that must be made before they enter schools of engineering, agriculture, pharmacy, finance, and liberal arts?

There are few greater misfortunes than the choice of a life career for which by nature one is not adapted. There is no waste so disastrous and surely none more costly to society than the waste of human resources resulting from educational and occupational drifting—from choices based on opinion and prejudice rather than on fact.

The promotional lines in industry, commerce, and the professions have been charted. Jobs have been analyzed. Variations in human capacity are well understood.

Mr. Superintendent, are you insisting fearlessly and unselfishly that all of "your boys and girls" shall have the fullest help in finding and using their hidden possibilities. Are you interested in their ambitions for success and in their desire to serve the world, or do you and your teachers follow the line of least resistance, turn your back to educational and vocational guidance, urge all to study without regard to the relation of subject-matter to life and take pride in your lack of "worldliness?"

Mr. Superintendent, you may be able to afford this attitude and this procedure, but, can the boys and girls who are dependent upon your methods and policies for their future economic and social status, for their future welfare and happiness, and for their power to serve the world? Think it over!

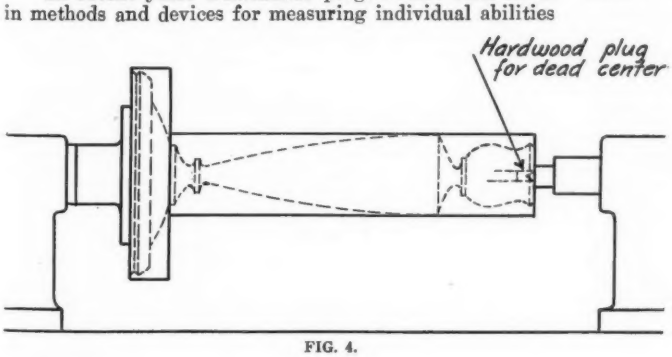


FIG. 4.

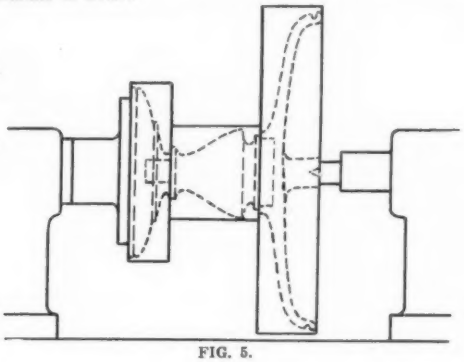


FIG. 5.

Stagecraft—An Extra Classroom Activity

Philip E. Burness, Instructor of Drawing and Shopwork, Lindblom Technical High School, Chicago, Ill.

Dramatics is one of the extra-curricular activities which, if directed by proper teachers, can encourage more cultural thought and accomplish more technical training than much of the ordinary classroom work. The writer wishes to present in brief form the manner in which a school may successfully meet all the mechanical requirements necessary to give a dramatic performance without enlisting any outside aid.

There can be no doubt that every school, both grammar and high, gives at least one dramatic performance a year. The performance may be in the hands of a person experienced in this work, or of one who knows very little of what he attempts. The inexperienced will in all probability rent, purchase ready made, or have made all or part of the materials necessary to make the performance a success on the mechanical side. Even the experienced person finds it easier to secure professional aid than to undertake for himself the working out of all mechanical details. In this article the writer hopes to show how the English or Dramatic department, with the cooperation of the Manual Arts department, can make a stage production a purely school project. The practice of neglecting the mechanical end of a production, that is, stage settings, lighting, properties, etc.; of using some clumsy makeshift and thereby jeopardizing the success of the actors, who usually will have worked for two or three months to perfect their end, is entirely wrong. There is no reason why the scenery, settings, costumes and mechanical effects—all very vital to the success of the performance—should not have as much thought and preparation as the acting. In fact, the quality of the actor's work depends very largely upon the atmosphere in which he must work; and proper atmosphere is a matter of the mechanical details of stage setting. That it is upon atmosphere, in great part, that the observer's enjoyment depends, needs no urging. A performer may work for months to perfect some bit of vivid action, only to have his work brought to naught by some fault in the mechanics of the stage. Cases of this are but too numerous in the experience of amateur performers. In many cases socalled amateur acting is without doubt of a higher order than is some professional work. Why, then, should not the mechanical side of the production be of equally high quality?

A Miniature Stage

To avoid guesswork and misunderstanding on the part of all those concerned in the performance, a very essential item in the adventure of stagecraft is the miniature stage. If your performances are given on the school auditorium stage, the miniature should always be an exact reproduction of the larger stage, to scale, of course. If you are accustomed to performing at different places, then build a miniature of the conventional standard stage. A very convenient scale is one inch to the foot.

FIG. 1. MODEL STAGE.

FIG. 2. STUDENTS AT WORK ON SCENERY FOR OPERA "MARTHA."

Fig. 1 is a photograph of a model of an actual auditorium stage. This model was built by woodshop boys, duplicating exactly the larger stage, on the scale of one inch to the foot. This was a school problem; a real problem, involving architecture, carpentry and decorative finish. The arched backs and sides of the stage were made next. These curved sides, which were shaped in parabolic fashion, are made of sheet metal. They were developed and fitted on the stage by the students in the sheet metal shop. These boys also made and fitted the miniature troughs that contain the footlights. Each of these sheet metal problems involves the principles of reflected light and sound in their relation to parabolic and slanted surfaces.

The stage, at this point, is turned over to the electrical department and is fitted with footlights, border lights and any other electrical equipment that the performance calls for. The model stage is now ready for the stagecraft class.

This class should consist of advanced art students. The writer has found students of the architectural course very fine material with which to work. This group can not only design and paint the scenery and properties but can construct it as well.

After the play or operetta has been chosen, the class obtains from the faculty director all necessary information on the number of acts, properties, etc., and on the amount of money to be expended. The model sets are made of bristol board and are decorated with water colors. Different groups of students design different sets, though two or more groups are sometimes asked to make one set for the same scene. Properties are worked out on the small scale. Various schemes to facilitate carrying scenery on and off the large stage are resorted to, thus stimulating the inventive faculties of the students. If the play is historical, every effort is bent toward portraying it as nearly historically correct as is possible. If it is modern, beauty and originality are the points striven for. This affords a wonderful opportunity for research, an important step in training for the arts and crafts.

FIG. 3. STUDENTS WORKING ON "MARTHA" SCENERY.

Much attention is given to the effect of lights, acquainting the students with the physical properties of light and pigment and thoroughly familiarizing them with the modern trend of scenic effects. After the necessary models are made, they are criticized, commented upon, and finally approved by the person in charge.

Building and Construction

The small models are now given to the woodworking class. As no details of construction are worked out by the students who designed the set, the woodworking students plan and construct the simplest and strongest scenery, always keeping in mind the hard usage it will receive. Here the woodshop students get a thorough training in carpentry (stage carpentry); a training that will give them, so far as the exercise of ingenuity, details of construction, and tool practice go, all that the ordinary course of house carpentry will give them. A complete set of scenery almost always calls for a set of stairs of some kind; and the stage carpenter must not only build a perfect stair—he must also make it collapsible or sectional in order to facilitate taking it onto and off of the stage. Thus, because it makes a call upon his ingenuity, stair building becomes more interesting to the boy. If the set be what is known as a box set—that is, if it be put together in the form of panels—such phases of construction as joining by half-hap, mortise and tenon, braces, etc., are gone into. In the construction of such properties as chairs, tables, couches, etc., perfection of finish is seldom striven for, but a full knowledge of the details of their construction is gained. Students find the construction of period furniture, made with a view to historical accuracy, especially interesting.

Often the play calls for the use of such properties as battle-axes, spears, swords, shields, drinking cups and mugs, light armor, etc. For these, the sheet metal department is called upon; and in the working out of these the boys take a particular delight, knowing that they will see them on the stage as the work of their hands. Then too, a scene frequently calls for the use of hardware that cannot be bought or is too costly. The forge is always glad to get this work, substituting it for the regular work, as do the students in other departments. The forge turns out such properties as wrought iron lamps, candlesticks, wall brackets, grates, andirons, braces and special hardware.

Few school performances are given that do not require the use of flowers. In the writer's school there is a special group, known as the Papercraft Club, engaged in making, under proper supervision, correct and beautiful flowers, vines, etc.

Stage Lighting and Electrical Effects

While fitting out the model settings, a lighting plot and list of electrical effects are made and turned over to the electrical department, where advanced students of electricity work out and make each bit of equipment necessary to make the performance a success from that angle. If necessary, a complete set of border, strip and flood lights is made. Rheostats are rigged up, and experiments with dimming up and down are tried. Buzzers, bells, lamp and light openings and circuits are installed where needed. The same students that have this work in hand follow it up at the time of the performance, by taking charge of all electrical details and making the electrical end of the performance fool-proof and a success.

Painting and Rigging

After all the scenery and properties have been made they are ready to be painted. A set of scenery that consists of a number of flat pieces is covered with unbleached muslin and is given a coat of priming. As far as it is possible to do so the students are given to paint those pieces of scenery for which they made the models. After the priming coat has dried, the work is laid out in charcoal. The students are given all the materials that will insure the saving of time and correctness of finish, and will at the same time give them a professional "feel" for their work. Dry colors are usually used, though prepared calcimine is sometimes necessary. Those who engage in this work learn for themselves the nature and strength of the various colors, the methods of applying these colors to large surfaces, color mixing, and the skill of lining with a straight edge. If the piece is a large drop, the material is stretched on a large frame, and is here completely painted and left until dry. The writer's class has successfully handled a drop 14'x32'. In painting interiors it is necessary by right lining to simulate panels, stencilled designs, molding, trim, etc. In this work there is ample incentive to proper concentration and good execution, for through these the student attains success, which is measured by the effectiveness of the illusion he creates. In making exteriors the student learns to create for the stage by use of color such things as walls of brick or stone, concrete or wood, trees, grass, trellises, water, sky, rocks, barred windows and a host of others that will come to mind. The shape, shade, color and value of shadows on interiors and exteriors are not neglected, nor are sunlight and moonlight. It is frequently found necessary to represent such minutiae as the grain of wood and the cracks and flaws in stone and concrete. And often it is necessary to give to a set of wooden stairs the appearance of stone. The effect of age on furniture, rugs and carpets, tapestry, tiles, shingles, bricks, stone, wood and concrete is studied with a view to reproduction.

Since all the scenery and properties are made to scale in accordance with the size of the stage, the amateur scenic artists will never have difficulty in filling the stage. Difficulties innumerable will confront the beginners, however, if the stage is not modern and equipped with a gridiron and rigging loft. Some of the problems to be solved are the suspension, lowering and raising of drops, and setting one scene inside another so as to insure rapidity in changing. These involve certain of the principles of engineering, and to the student whose inclinations are in this direction stagecraft becomes doubly fascinating.

When it is possible to do so, the students who designed the sets are called into service as stage hands at the time of the performance. This is done for the reason that they are more familiar with the stage and the scenery and are more likely to be interested and careful in handling the sets than those would be who had no hand in the construction. One student is appointed stage

manager; specific duties are assigned to other groups and individuals; and in every case the scenes are shifted quickly, quietly, and correctly.

Conclusion

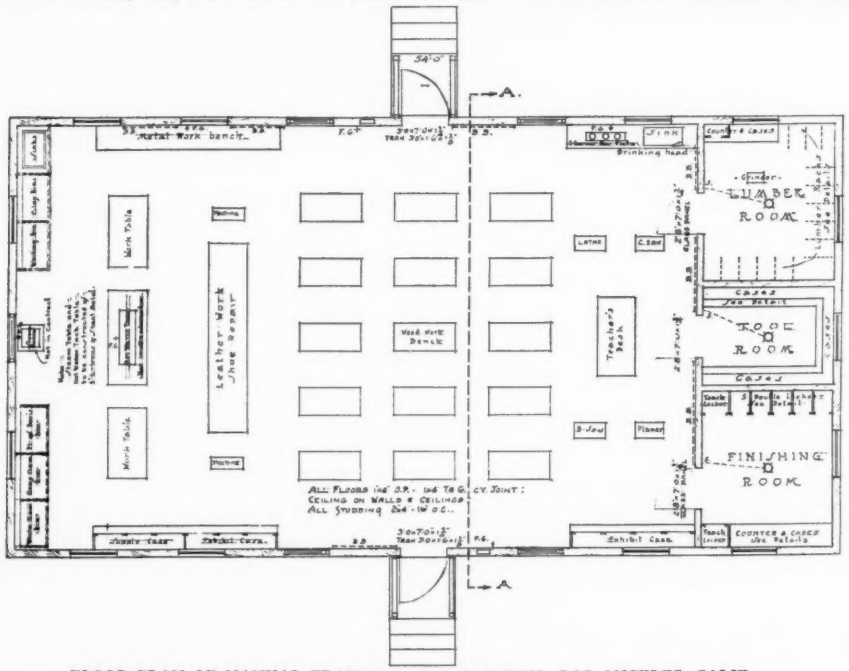
In conclusion the writer wishes to call attention to certain groups of students who, though not actually engaged in the mechanical work consequent upon a dramatic performance, are yet quite necessary to its success. These are the members of the sewing department, publicity corps, orchestra, costume designers, ushers and candy sellers (in the writer's school confections are sold between the acts).

The giving of a dramatic or operatic performance is usually considered an extra-classroom activity; but if the persons in charge conduct this activity in the proper manner it really becomes an all-school affair, involving more students than any other school activity. This makes for that development of social consciousness that is the proper end of all education.

AN INTERESTING MANUAL TRAINING SHOP

The accompanying illustration represents the plan of a special manual training school building which is being erected in connection with several outlying school buildings of Los Angeles. It is especially arranged to handle the elementary wood working, clay and cement work, sheet metal work, book binding and other work offered for the fifth to eighth grades inclusive.

The buildings are constructed of wood and very simply finished on the inside as well as outside. The plans were developed by Mr. E. H. Klein, architect for the board of education, from preliminary layouts by Mr. C. A. Kunou, supervisor of manual training.



FLOOR PLAN OF MANUAL TRAINING SHOP BUILDING, LOS ANGELES, CALIF.

HOME ECONOMICS IN BUSINESS.

That a new line of opportunity is opening for women in the channels of business through the training in home economics is the contention of the Bureau of Vocational Information of New York City. In a recent news bulletin it says:

"With the increasing recognition on the part of business that women constitute the greater number of consumers a new opportunity is opening for women. Since he is selling to women, the manufacturer or dealer realizes that he needs a woman's point of view in his business. At first any woman seemed acceptable and was employed to introduce 'the woman's angle,' as one business man phrased it. While she accomplished some results, experience is rapidly proving that not any woman's point of view but the trained woman's cooperation is what can really help in developing the service business would offer.

"The trained woman who enters the business world uses her knowledge to better the products upon which depends the application of the new methods and theories so extensively taught to the home-maker today. Manufactured articles have largely been planned, advertised and sold by men or women not trained in the science of home-making. But most business organizations are alert for information and the up-to-date business man has a real idea of service. The money spent for advertising every year constitutes an enormous educational fund; advertising and sales campaigns affect every phase of home life and largely determine the equipment of the home. This situation offers at the same time an enormous and but little explored field of opportunity to the woman scientifically trained in home economics, and her most effective means of making home economics information really function in the homes of today.

SHOP RULES

Mr. F. E. Allen, manual arts instructor at Pendleton, Ore., offers the following regulations for the organization of a shop.

1. **Tool Checks.** Each student must obtain tool checks. Ten checks are issued for ten cents each. These checks must be used when drawing tools from the tool room, one check being given for each tool. No tools will be issued without checks. At the close of the year the tool checks are redeemed at ten cents each.

2. **Time Cards.** Time cards will be found and kept in the rack on the north side of the tool-room door. The card shows the name, number, A. M. or P. M., unit symbol, description of the job, date worked on, and number of hours. The following unit letters will be used: M, machine shop; F, forge; A, auto mechanics; T, tool room; S, stock-keeper; B, shop boss. No credit is given for the time unless it is entered on the time card.

3. **Work.** Each student is supposed to have a job and must keep working at it. Upon completion of a job, the pupil should report immediately to the instructor for new work. The shop is a work room and not a loafing place.

4. **Safety.** Remember that a machine has no feeling or sympathy, therefore safety first. An ounce of prevention is worth a pound of cure.

PROBLEMS & PROJECTS

This department aims to present a wide variety of class and shop projects in the Industrial Arts. Successful problems are invited and will be paid for. A brief description of constructed problems, not exceeding 250 words in length, should be accompanied by a good working drawing. The originals of the problems in drawing and design should be sent.

Problems in benchwork, machine shop practice, turning, pattern-making, sewing, millinery, forging, cooking, jewelry, bookbinding, basketry, pottery, leather work, cement work, foundry work, and other lines of industrial-arts work are desired for consideration. The editors will not accept the old hackneyed problems of footstools, taborets, towel holders, etc., which have been made from time immemorial, ad nauseum.

A JOB SHEET FOR HOME MECHANICS

F. E. Tustison, The Stout Institute, Menomonie, Wisconsin

The following job sheet is suggestive for general home mechanics.

JOB SPECIFICATIONS:

To make an awl from a broomstick and a 10d nail. An awl is a handy tool about the home and is most necessary when any screws are to be set. It is useful in the setting of hinges, hasps, cupboard latches, screen hooks, window shades, and similar devices that are fastened on with screws. It is especially convenient in the re-setting of a door-striker that has gotten out of alignment with the door bolt. It can also be used as a scratch-all.

MATERIAL:

Broomstick with wire still attached, and a 10d nail.

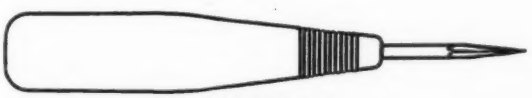
TOOLS:

Plane, wood-rasp, file, sandpaper, hammer, small brads or drill.

PROCEDURE:

(1) Form the handle. The handle is shaped as per diagram. It is best to form the handle while it is still attached to the stick. The taper is secured by means of a

SHAPE OF HANDLE.



FINISHED AWL.

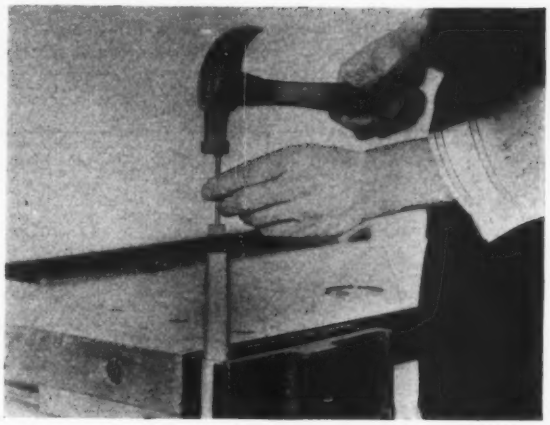
plane and finished round with a wood-rasp. Other tools that might be used for this are the drawing knife or jack-knife. The groove is easily put in with a rasp. Caution: Do not saw handle from stick until No. 4 is completed.

(2) Wrap with wire. With a fine wire brad or drill put two holes through the end of the handle, one at each side of the groove. Place holes so they miss the center of the handle as awl point occupies this space. Remove some of the wire from the bottom of the broomstick and insert in hole nearest end. Wrap wire evenly in the groove and finish by inserting end of wire through the remaining hole. Clamp end of wire in vise and pull it tight. Cut off wire with a file.

(3) Insert nail. Clamp the broomstick in the vise with the shaped handle up. With a drill or nail start a pilot hole in the end of the handle. Make hole smaller than the nail used as an awl. File the end of the 10d nail to a flat end. With a hammer, drive it into the handle leaving 1¾" projection.

(4) Form point. With a file cut off the head of the nail and taper to a point. The most satisfactory point is made with four sides. The four edges act as a reamer when drilling. The nail can be replaced with a tool steel rod if desired.

(5) Finish handle. Saw handle from the broomstick and after rounding off the top with a rasp, sandpaper. Finish with a coat of linseed oil. If linseed oil is not at



DRIVING THE POINT.

hand, lubricating oil will do. Shellac makes a good finish if it is obtainable.

QUESTIONS:

(1) What might be repaired around the home by wrapping with wire?

(2) What might be used for a ferrule instead of the broom wire?

(3) Why is nail filed flat before it is driven into the awl?

(4) What would be the advantage of the tool steel rod over the nail for a point?

(5) Why use four edges to the point?

(6) What can awl be used for?

RECORD:

Name ..... Class .....
Date begun..... Date finished.....
Have you answered all of the questions?.....
Instructor's Grade.....

THE AWL IN USE.

COLONIAL TIP-TOP TABLE

H. J. Wieland

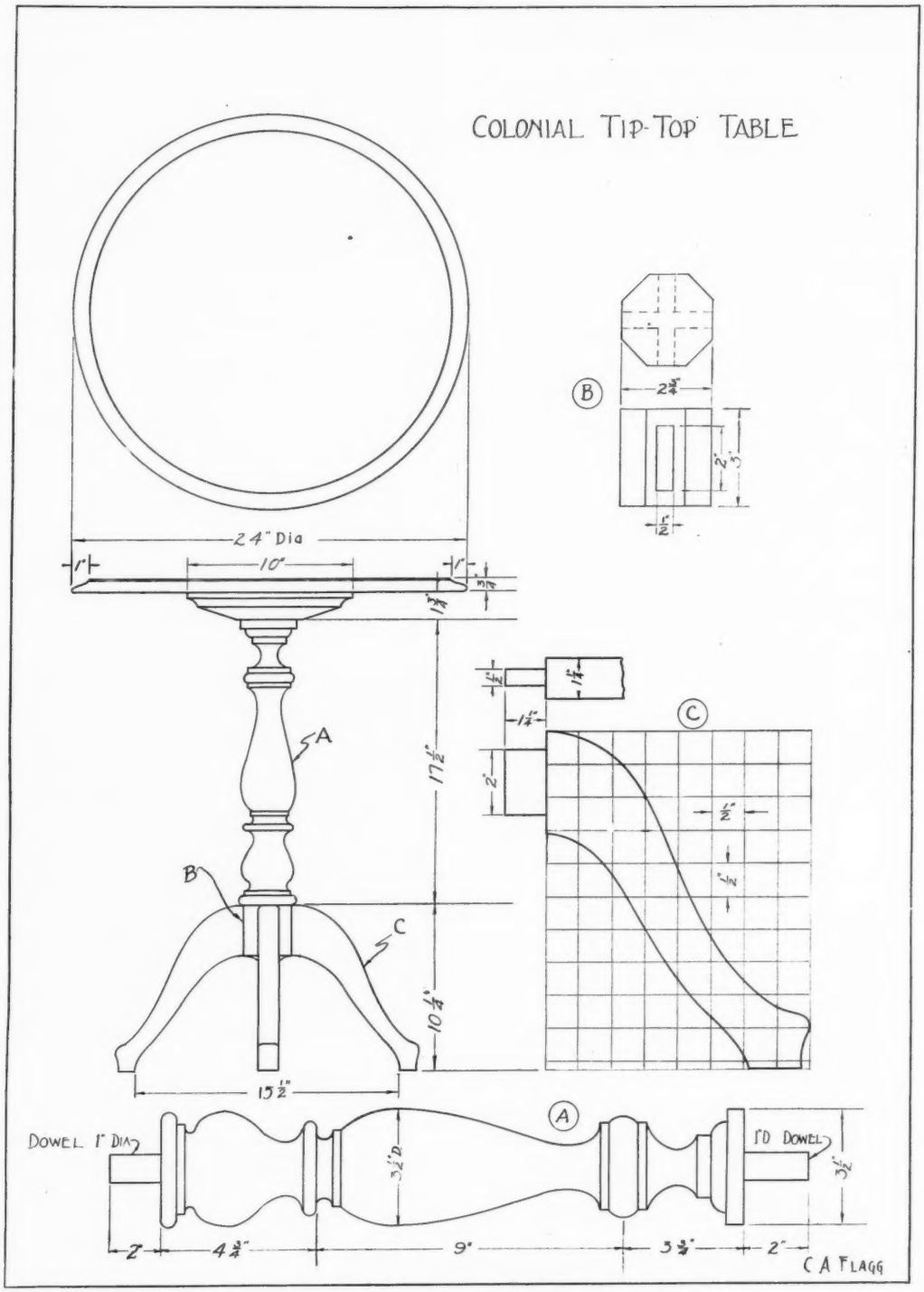
The colonial tip-top table is a high-school cabinet making project. It is designed to be built with the same equipment as the console table, namely, a lathe, bandsaw and jointer. It is possible to dispense with the latter and do the planing with a hand jointer.

The round top may be fastened solidly by means of a small sub-top, screwed to the top's underside with the leg dowelled into this sub-top; or it may be built as a tilting-top with a hinged fastening device. This may be made by splitting the sub-base far enough off center so that when hinges are fitted to the joint, the top may be tilted to a vertical position. The top may be secured in this position by a number of different methods. A simple

method is to use a loose pin, fitting holes bored to correspond, to either the tilted or horizontal position.

Turn the center post. Square up a block and mortise to receive the legs, and bore to receive the dowel of the center post.

After gluing up and surfacing the top, bandsaw it to shape. A moulded edge adds greatly to the top of such a table. If a shaper is not available, it can be turned on the lathe. In case the lathe will not swing this diameter, it is possible with certain makes to turn the entire head-



DETAILS OF COLONIAL TIP-TOP TABLE.

The legs should be tenoned before bandsawing; either three or four legs may be used. The legs should be laid out on the stock in such a way as to avoid any short cross grain, which weakens them.

stock about the lathe-bed so that the large diameter piece is swung over the outside end of the lathe. A floor rest is then used. A larger wooden face plate can be attached to the underside of the top and to the lathe's standard

THE TABLE AS MADE IN THE SCHOOL SHOP.

face-plate, with the precaution taken not to run a piece this size at high speed.

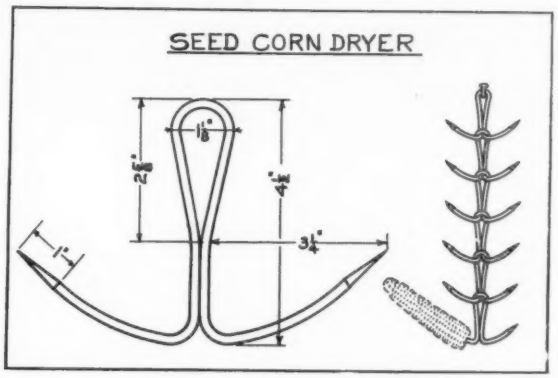
Much of the rubbing in connection with finishing the table can be done with the parts in the lathe before assembling. This method properly used will give a quick and high grade finish to the work.

COLONIAL STOOL

A. M. Mercker, Supervisor of Manual Training, Quincy, Illinois

This project is the result of an effort of the writer to combine wood turning and bench work in a project which affords a good variety of work in construction and design and still is consistent with the possibilities of the average school shop.

No formal preliminary turning is necessary to do the required turning. The necessary skill can be acquired by turning to a cylinder, the short rungs, long rung and the



DETAILS OF A SEED CORN DRYER.
MADE BY EBER L. MOORE.

posts, in the order named. Then lay out and do the scraping tool work, following in order with the gauge and skew chisel work.

The posts should be cut out on dimensions sufficiently large to allow for any inaccuracy in centering. After the cylinder has been turned to the required diameter, dimension the post by planing the sides tangent to the cylinder.

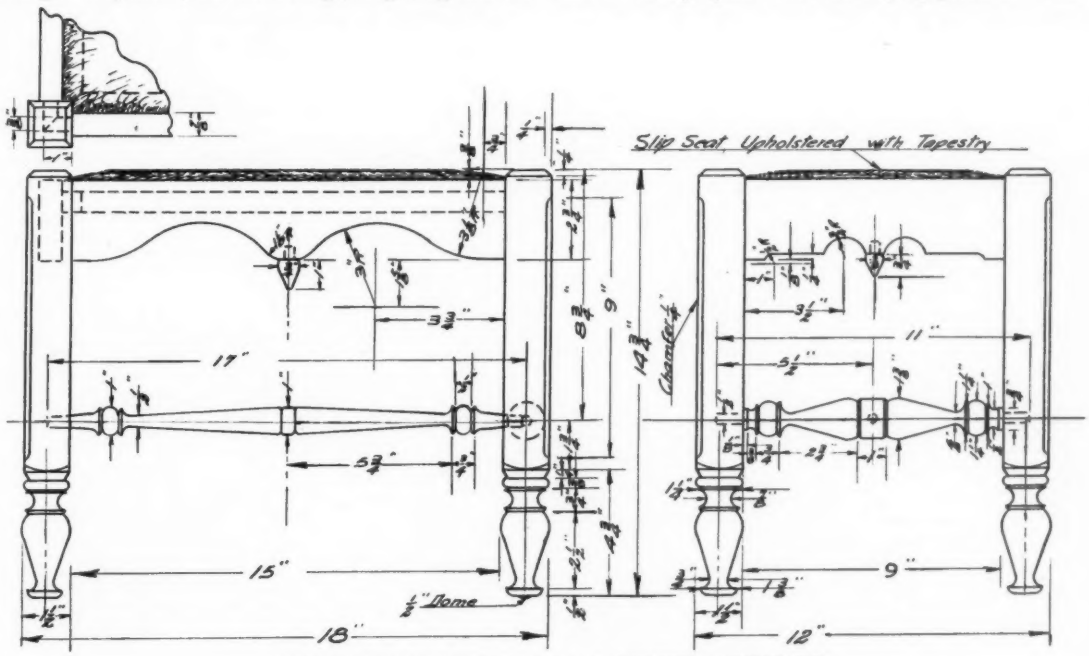
The turning should be thoroughly sanded on the lathe, but the finish can be conveniently done after the assembly has been made.

A PHOTOGRAPHIC PRINTING BOX

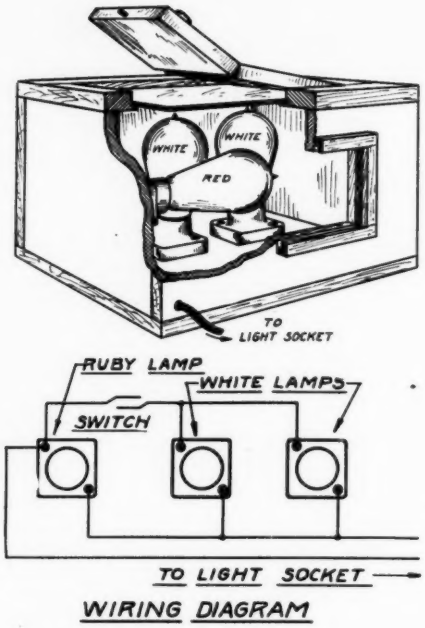
Wm. A. De Vette, Erie, Pa.

The accompanying set of illustrations shows a problem of value to the instructor of a general shop. The problem takes in both woodwork and electrical wiring. The printing box is also of interest to the students because many of them have cameras and would like to develop and print their own pictures.

The top and bottom of the box are of ¾" stock and the sides of ½" stock. The top is cut out so a 5"x8" piece of glass may be laid in on which to place the films and paper. One side of the box has a 4"x5" hole around which a slide is built for inserting a ruby glass when developing films and an orange glass when developing pictures. This is



COLONIAL STOOL DESIGNED BY A. M. MERCKER, QUINCY, ILL.

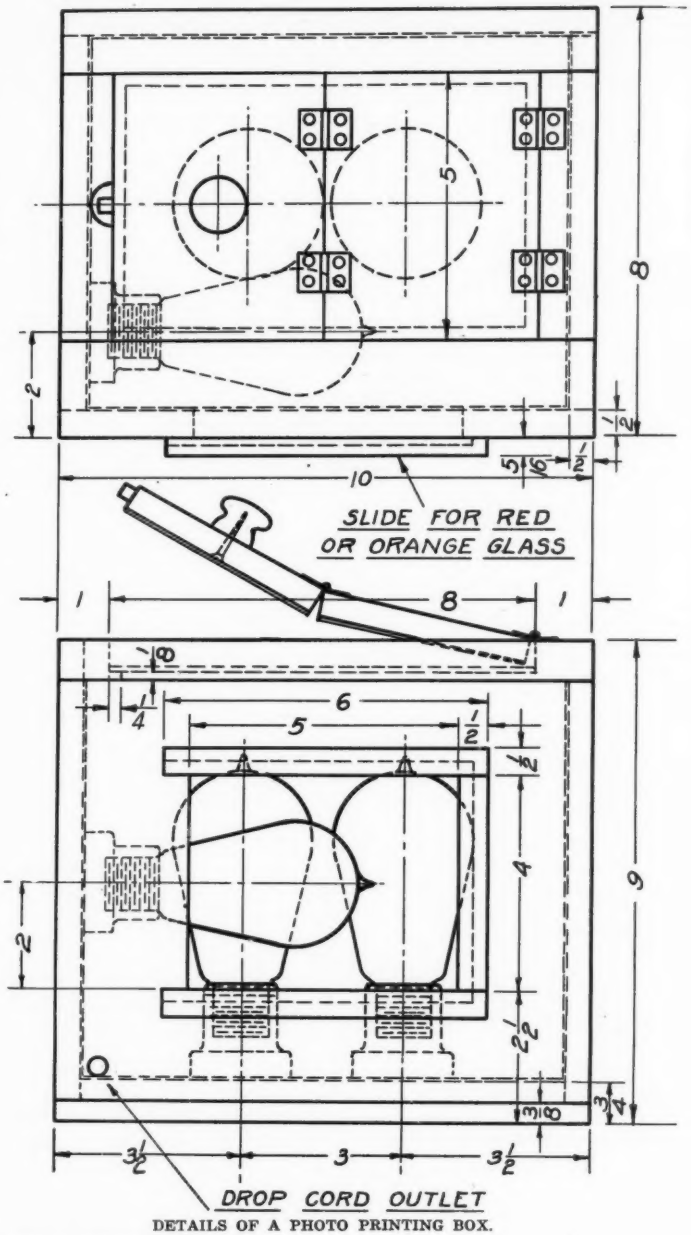


done so that the room may be entirely darkened and the developer placed near the box.

The lid is made in two parts and hinged in the middle and at one end so half the lid may be used to hold the paper in place while the hand is withdrawn. It also contains a button at the loose end which closes the electric circuit when the cover is in place. The box should be lined with thin sheet asbestos.

The wiring is simple, all the lamps being connected in parallel with a spring contact switch between the red and nearest white lamps. The switch may be of any type the instructor finds it possible to make, just so closing and opening the lid will close and open the circuit so that while the cover is held down a picture may be exposed.

The lamps used in the box made by the writer are a 25 watt, ruby colored lamp and two 60 watt, white lamps with frosted ends. These have been found to be the best as the diffused light causes no high lights in the picture.

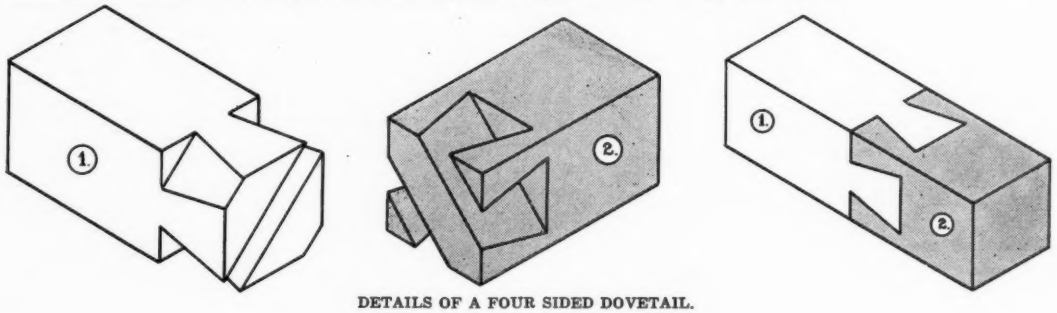


DETAILS OF A PHOTO PRINTING BOX.

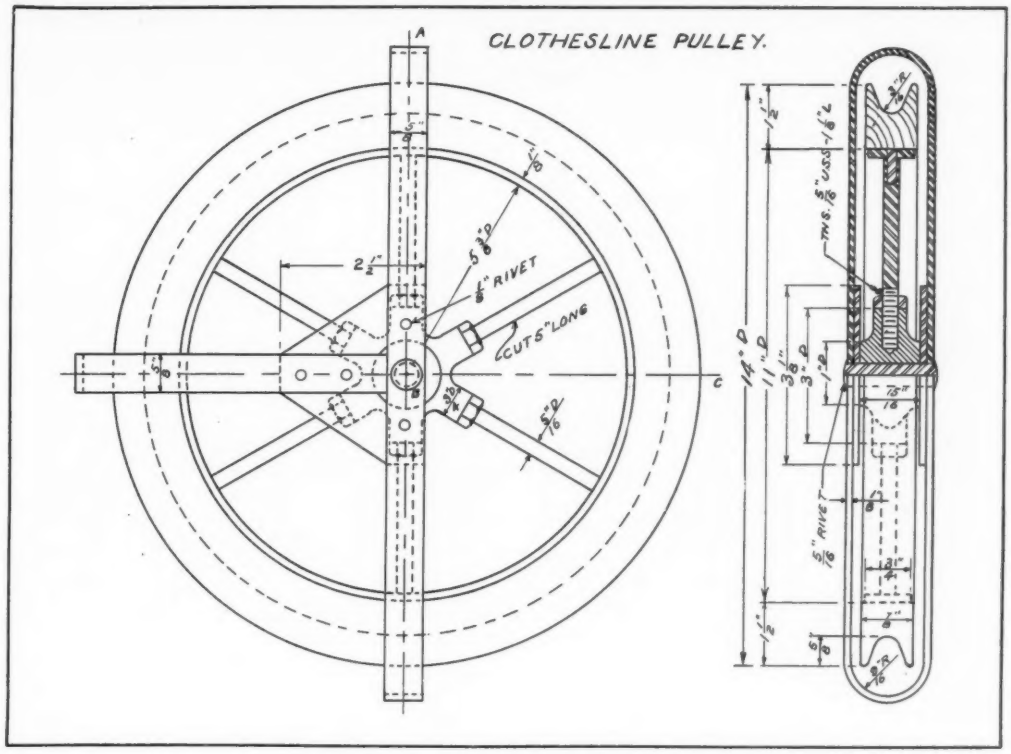
A FOUR SIDED DOVETAIL

S. M. Turrill, Maywood, Illinois

This joint makes an interesting puzzle for the woodwork shop. Any waste stock may be used. The apparently impossible joint becomes very simple when the details of figures I and II are studied.



DETAILS OF A FOUR SIDED DOVETAIL.



DETAILS OF A CLOTHES LINE PULLEY.

A MACHINE SHOP PROJECT

Walter Vernon, Cohoes, N. Y.

This project was designed to give the boys in elementary machine shop practice a chance to learn the use of the following tools: rule, hammer, center punch, drills, files, tap and die. Incidentally it provided something of interest and value for home use.

A small drill press is the only machine necessary to complete the machine work on the pulley. If a small wood lathe is available, the wooden rim may be turned on the inside to fit the outside circumference of the metal wheel. The lathe may be used to cut the groove in the pulley, although a face plate on a small motor will do as well for these operations. The wooden rim can be built in six segments and splined or made by using two courses of segments glued together.

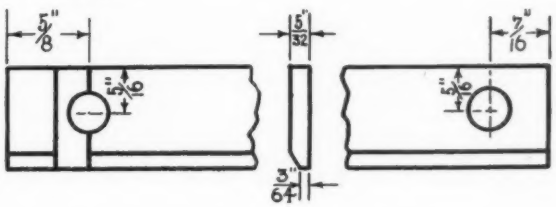
This project offers a splendid opportunity to correlate the related subjects with its construction. Science in the way of levers, mathematics in cutting stock, laying out holes to be drilled, and estimating the length of metal rim. Safety first has its place, because of the danger involved in leaning out of windows to pull washed clothes in and out.

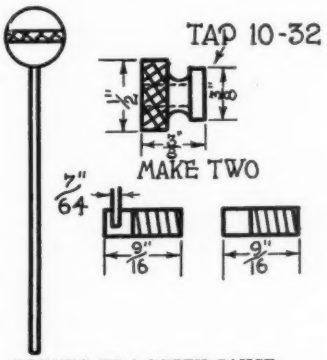
A short paragraph on the construction of a pulley would give a splendid English lesson.

DEPTH GAUGE.

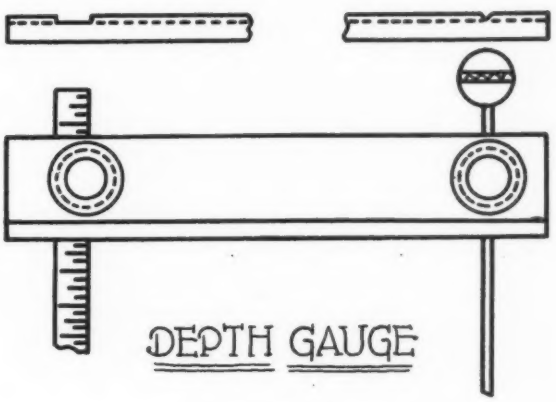
Grover C. Polson, Oakland, Calif.

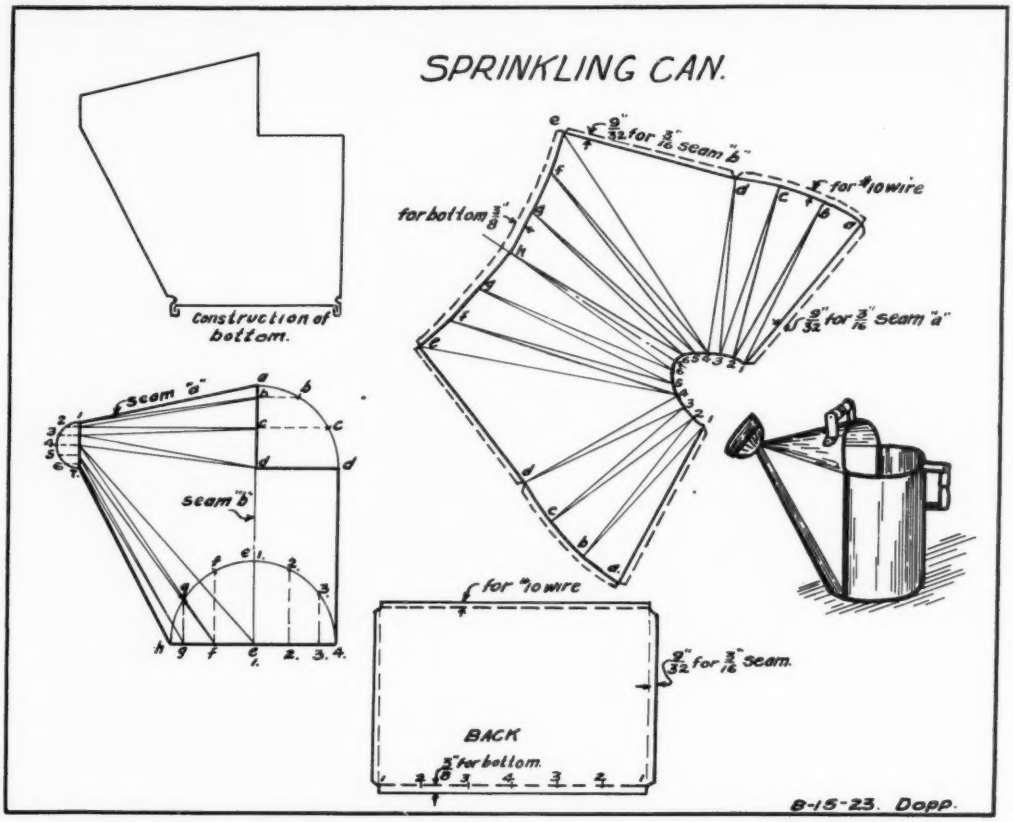
This tool is made from 5/32"x¾" stock. The slot in one end is cut ¼" x 4" to fit the standard ¼"x4" steel scale, 3/64" deep. On the other end a grove 1/32" radius is made to receive the 1/16" rod. The two 10-32 screws are turned to 3/16" in diameter and a 7/64" slot is cut close to the end 3/32" deep to receive the scale. A hole in the other screw is drilled to the size of the measuring rod for a slip fit.





DETAILS OF A DEPTH GAUGE.





DETAILS OF A SPRINKLING CAN DESIGNED BY MR. R. L. WELCH, MENOMONIE, WIS.

WESTERN ARTS MEETING

The program committee of the Western Arts Association has centered its efforts on obtaining the best available talent as speakers for the next annual meeting of the Association, to be held May 6, 7, 8 and 9, at Dayton, Ohio.

The convention sessions will be held in the beautiful Memorial Hall, where all activities will be centralized in one building. The commercial and educational exhibits will be housed on the ground floor, while the convention sessions will take place in the auditorium above. The Memorial Hall is only a short distance from the headquarters and the hotel district, and is well adapted for use as a convention meeting place.

On the program will be prominent superintendents and college presidents who will present their views on the trend of art and industrial education. An illustrated talk on Industrial Arts Instruction in the Platoon School, and further addresses on Household Mechanics for the Intermediate Grades, and Landscape Gardening for Schools, will be given by a number of well-known educators.

The round-table section of the program is rapidly being worked into shape and the art section is in completed form. Art appreciation will form the basis of a talk to be given at one of the sectional meetings. There will be several demonstration lessons, one on art appreciation to be followed by papers on the subject, and one on paper construction. At this session also, there will be a forceful presentation of The Old and the New Vision in Art Education. One of the important speakers will be Mr. Gerrit A. Beneker. Mr. Beneker was the creator of the Victory Loan Poster of war-time days, depicting the picture, "Sure, we'll Finish the Job." Mr. Beneker is a forceful speaker and his talk will be illustrated with lantern slides. A report of last year's progress in the Study of Measurements in Drawing will be presented at this time.

At the household arts session, the topics of Teaching Clothing Design, and Art in Home Economics will be discussed. The Industrial, Printing and Vocational Sections of the Association have also prepared excellent programs, giving promise of a number of worth-while discussions of these subjects.

VOCATIONAL EDUCATION SOCIETY OF BOSTON

February Meeting

Can growth be accomplished unaccompanied by growing pains? In the case of the Vocational Education Society of Boston the answer is in the affirmative. The Society is growing in numbers and in the effectiveness of its programs to attract increasingly large attendance upon its regular monthly meetings.

Perhaps some of the members were tortured by the pangs of hunger as they waited for the management to arrange extra tables for the February luncheon at the Hotel Healy in Boston. The waiters surely were hard pressed to serve unexpected patrons and at the same time maintain their professional dignity and impassivity. However, no casualties were listed and no rainchecks issued.

In the course of the business meeting a representative from the Massachusetts Federation of Teachers reviewed measures affecting the profession which are to be considered by the legislature in its present session. The measures proposed relate to tenure of office. If they are enacted as laws a teacher will be privileged to demand written charges where dismissal is contemplated; he will have the right to present witnesses in his own behalf, and will have recourse to a final appeal to the State Commissioner of Education. The Society was requested to lend its support to committees forwarding the measures.

Once again the message of death was brought and those present at the call of the president stood in silent and respectful tribute to the memory of a fellow member, Charles F. Richardson, who died February 14, at his home in Boston.

Henry Lewis Johnson, of the Graphic Arts Company of Boston, held the interest of his audience while he talked on the subject, "How Design is Used in Modern Printing." An exhibit of fine printing was displayed, and pamphlets from the Warren Paper Company were distributed by the librarian. Mr. Johnson asked that printing instructors include in their courses of study so much as possible material relating to art as it is applied to printing.

More than ever before banks and other great institutions are demanding that their printed messages to the

public should conform to the same high standards of art apparent in their buildings and equipment. There is a real demand by printing and publishing houses for tradesmen who are trained in art and design as it relates to their trade. Originality is not a desirable element, according to Mr. Johnson, as all design in printing should grow out of architectural motifs and forms. A knowledge of the basic forms and a command of the principles of selection are to be sought for by the printer who wishes to make himself fully competent in his calling. The least the printing instructor can do for his charges is to bring them in contact with the master pieces and encourage every interest which will lead to further study in the field of art and design. Mr. Johnson asserted that something must be done in this direction if Boston and New England would conserve its advantage and prestige as a printing center.

In addition to Mr. Johnson's address, Mr. Joseph H. Pynchon, secretary to the commission on Apprenticeship for the building industry, explained the system under which apprentices for the building trades are being trained in Boston.

The need for apprentices in the building industry has been aggravated in recent years by a great amount of construction and by a general lack of organized cooperation between employers and mechanics. Each trade has acted independently and much of the initiative has been left to individuals. There is a necessity for a recognized channel to handle all apprenticeship promotion.

The Boston Commission on Apprenticeship, established in March, 1923, now affords a definite channel for all apprentice promotional work in Boston. The Commission consists of nine members—two men representing each the Boston Building Congress, the Building Trades Employers and the United Building Trades Council. In addition, there are an architect, an engineer, and a material distributor. The Commission is headed by Mr. W. S. Parker and acts as a general advisory and supervisory body. The real work is being done by joint committees in the various crafts, each committee composed of three mechanics and three employers. These craft committees determine details in harmony with the general procedure developed by the Commission.

The Committees are outlining the conditions of apprenticeship and the courses of instruction and are undertaking to keep apprentices continuously employed. The carpenters' and bricklayers' crafts have committees actively at work and general committees are being formed in other building crafts.

The Commission holds that the technique of each craft should be obtained by work on the job, and that related subjects should be taught in evening classes. Contact with the school authorities is through the Commission and cooperation for establishing necessary courses is being given. Classes in carpentry and brick-laying were started in December and other courses were opened in January. The related training consists generally of mathematics, drawing, science and English. It is expected that the related schooling will extend through the term in each of the three or four years of apprenticeship.

The Commission has adopted general regulations which provide the following points applicable to all crafts: The apprentice is enrolled and given an identification blank to summarize his work during the apprenticeship period. A probationary period of six months is provided. Boys must be at least 16 years of age and not more than 22 years. The regular term of years of apprenticeship, as determined by the craft, is divided into periods of six months, at the end of which time each apprentice is examined to qualify for advancement. The graduate is given two credits for previous experience. Interchange of employment is promoted where this may seem necessary. The wages are advanced by periods, on the basis of a percentage of the journeyman's wage. Applicable to each craft, special regulations have been drawn up outlining courses of study, ratio of apprentices to journeymen, granting diplomas on determination of apprenticeship, etc.

The Commission has established temporary offices at 120 Boylston Street, where the secretary is establishing the contact between the interested parties.—**John I. Lusk.**

SCHOOL CRAFTS CLUB

The program for the February meeting of the School Crafts Club was under the direction of Mr. L. J. Young, supervisor of shopwork in New York City. Beside speaking himself, he introduced two other New York teachers: Mr. Fred C. Arnold, instructor of industrial arts, Evander Childs High School, and vice-President of the School Crafts Club; and Mr. Michael C. Dank, teacher of shop work, P. S. 109, Brooklyn. The Club met on Saturday evening, February 16, at the Ethical Culture School, New York City.

The following men were accepted into membership: Mr. James H. Gleason, Elizabeth, N. J.; Mr. Thomas W. Kerwin, Elizabeth, N. J., and Mr. Albert D. Mowery, Westfield, N. J.

Mr. L. J. Young spoke on "Educational Charts and Their Value as Aids to the Teaching Process." The substance of Mr. Young's remarks are as follows: While there are three types of people populating the earth—the dead, the lingering, and the quick—the same three classifications may be applied to the teachers of shopwork. There is the telling teacher, who does not make sure that the information he tries to impart is received by the pupil. While his motives are sincere, still he is asleep on the job, and is only going through a certain routine, marking time, and does not have the interest of the boy at heart. There is also the lingering type, the teacher who teaches everything, who has knowledge and wisdom to look for reactions. Yet he still does not go far enough. The quick teacher is one who leaves a lasting impression on the boy. He is progressive and looks beyond the immediate facts at hand. He belongs to organizations for professional improvement, such as the School Crafts Club. He is always on the alert for better methods to accomplish the aims he has in mind.

For an instance of the appeal of pictures to the human eye, Mr. Young cited the Daily News published in New York. This is a small size paper, which is full of illustrations; and while we cannot agree with its sensational methods, still we cannot discount the appeal through pictures which gives it such a large circulation. In teaching our shop classes we must have illustrative matter in the form of teaching charts. They are necessary in order that the pupil may visualize what we attempt to impart. Our minds are all susceptible to the picture appeal, young and old. Attention is paid to pictures before a child learns to read.

We all feel the effect of orderly arrangement. Strife comes because somebody is not orderly. Cities are built with this as one of the aims in the lay-out of the blocks and construction of the buildings. Lines run parallel and perpendicular to each other. The pupil admires a good analysis of a problem as worked out in a chart.

Those who are mentally normal have a sense of balance. We step on a banana skin, and what happens? At least we attempt instinctively to recatch the balance we had previously. In buying fruit we watch the scales, not necessarily to see if we are being cheated. In the country we are continually noticing that which is out of balance, such as a barn with a cupola one-third of the way from the end, instead of being at the end or center. We notice chimneys which are out of alignment. In educational charts we must be quick to sense a state of balance in their lay-out.

Teachers must guide the mental diet of children. Prepared charts help to sell and get across ideas to them. These charts must have good technique, therefore for many teachers courses in art work will be necessary, or at least as applied to the making of charts. Unity is an outstanding feature in chart making. The important feature is made dominant by subordinating other things of less importance. A chart also satisfies a demand for a volunteer assistant when repetition is necessary.

Now as to thinking ourselves into the condition for making an educational chart. It must carry to all parts of the room. Mr. Young showed clippings from magazine covers, having a predominating feature, which if enlarged, would carry better. Charts must attract attention. One method used is to have two features on either side of the important one in order to catch the eye, which automatically rests between the two. Mr. Young displayed a fine collection of charts, illustrating tools, processes, and order of procedure. Lettering should be filled in and not only simply outlined, to carry well. Sign painters' oilcloth and curtain stock are good materials to work upon.

Mr. Fred C. Arnold spoke upon "The Development of a Composite Shop in a High School." Up to the truly vocational shop all work should be pre-vocational. If this is true, then the high school shop should be of this nature. Many teachers have had the experience of the school principal considering the shop as a dumping ground for failures in language, etc. This is wrong and the work should be given to all students. The mortality rate in the high school is often as high as twenty-five per cent before graduation. What becomes of those who do not

graduate? High school shop work should follow up the work covered in the grade by being of a maturer nature. The same principle is followed in English, then why not in shop work? Here are the objectives of such a course as outlined by Mr. Arnold: (1) development of habits of neatness, carefulness, and accuracy; (2) development of ability to think out, plan, and execute; (3) to gather first-hand information as to proper procedure, all time not to be spent at the bench; (4) development of ability to observe; (5) self-reliance; (6) acquaintance with trade practice.

Mr. Michael C. Dank, who beside being a teacher of shopwork is also a designer and manufacturer of toys, spoke upon the subject of "Educational Toys in the School and in the Commercial World." In his teaching, Mr. Dank has to deal with handicapped children of three classifications: crippled, backward and anaemic children. The crippled children have to be given work in their classroom where they can be seated comfortably. For this purpose the use of coping saws on toy construction solves the problem. The youngsters enjoy the work and in most cases turn out work equivalent to that done by adults in commercial toy making. The mentally deficient children bring up a different problem. While they can develop fair skill, their work must not be made too intricate because of their weak mental forces. They work on regular woodworking benches and can even be given projects such as aeroplanes and boats.

It has been a hobby with Mr. Dank to design playthings so that children may get educational value out of making and using them. Toymaking has become a great industry, as evidenced by the large sized journals which are in circulation monthly on the subject. The American mnufacturers specialize in the educational toy. The keynote of success in toymaking is to get the educational aim over to the children without them realizing this purpose—to make them enjoy the toy construction. Types of educational toys for sale are erector sets, clay modeling, teaching games, etc. The most popular toys among American parents are those that teach. One great embossing company makes nothing but blocks of all descriptions. The toy industry borrows many ideas from teaching methods and subject-matter.—**Lloyd F. Stair.**

THE FARM SHOP AT LEBANON

As the farm shop construction and equipment are now commanding such a large interest in many of the vocational agriculture schools, a financial statement of the building operations should prove of interest to those teachers and pupils still in the figuring stage.

The Salem, Oregon, News-Item offers a brief description of the farm shop building erected and equipped by the students at Lebanon, Ore., together with a bill of materials and a list of the necessary equipment.

The Lebanon shop is 28'x56' in size, constructed of rough lumber bought at a discount. The use of unsized lumber greatly increased the labor cost. As the construction was all done by students of the agricultural classes, working in relays, the labor cost is not reported and at best can only be an estimate. The ceiling height is ten feet and the roof structure is on the bridge-truss plan. The roof is shingled and the siding is of vertical boards with battens. There is a large door at one end to admit machinery and cars. At the opposite end a space about eight feet wide is floored and fenced off for a tool room, the remainder of the floor space being filled in with earth. The exterior will be stained as soon as the weather permits. The equipment while not yet adequate for future classes, will be sufficient for the beginning of the work. The shop is a fitting expression of the enthusiasm and resourcefulness of the students and instructor who designed and built it.

Cost of Farm Shop—Lebanon High School

COST OF MATERIALS FOR CONSTRUCTION

H. B. Chess—	
2280 ft. rough lumber from Kings Mill at $19.00 per M..	$ 43.32
1000 ft. battens at $20.00	20.00
4500 ft. of rough lumber at $15.00	67.50
Dan Young—	
1 fireproof flue	6.50
South Santian Lumber Co.—	
20 M. shingles at $3.80	76.00
Deters Electric Shop—	
Wiring building and materials	25.00
Lebanon Hardware Co.—	
15 lbs. 8 penny nails	.90
60 lbs. 3 penny fine blue	4.50
10 windows 9x13 glass	30.00
30 lbs. 12 penny nails	1.80
11 lbs. box nails 6 penny	.65
66 ft. of 5 ft. netting	3.30
Locks	1.60
Total	$281.07

EQUIPMENT AS LISTED

Pioneer Hardware—	
Anvil (100 pounds) and hardy	$ 19.50
Grindstone	9.00
Machinist box vise	7.25
Lebanon Hardware Co.—	
6 joints of stove pipe	1.50
T joint	.95
6 inch elbow	.25
Flue stop	.15
Blacksmith's blower	28.50
Square flatter	2.25
Tool grinder	6.00
Forging tool	.85
Tongs	1.15
Bolt tongs	1.25
Pick-up tongs	1.50
Gad	1.50
Heavy hammer	2.00
Ball pein	1.35
Shoe lasts	3.25
Light hammer	.50
Post drill	16.50
Pipe vise	4.50
Total	$109.70

EASTERN ARTS CONVENTION DATE

The Eastern Arts Association has announced that its convention for 1924 will take place on May 15, 16 and 17 at the Hotel Chalfonte-Haddon Hall, Atlantic City, N. J.

The Atlantic City school people have organized a local convention committee headed by Dr. Charles B. Boyer as advisory chairman and Miss Clara H. Krauter, Director of the Vocational School as active chairman. Atlantic City is famous for its entertainment of conventions and assurance has been given that the entire meeting including exhibits and meetings will be comfortable and satisfactorily housed.

An announcement of the program will shortly be made.

VOCATIONAL EDUCATION AT THE CHICAGO CONVENTION

Vocational education received more attention during the recent meeting of the Department of Superintendence, February 23-28, in Chicago, than it received during all the previous years since the establishment of the Department. The superintendents and other officials in charge of the administration of city and state school systems, definitely recognized the growing importance of vocational work by discussing in their own sessions, various topics relating to vocational education and by permitting the Department of Vocational Education and Practical Arts to hold two departmental meetings.

The amalgamation of all organizations interested in vocational education occupied the Department of Vocational Education the entire afternoon of February 26th. Mr. Charles A. Bennett, of Peoria, Ill., presented the scheme which he has discussed at various times for organizing all associations into a federation. Opposition to the idea of federating, at least so far as the vocational guidance people and the home economics people are concerned, was voiced by Mr. Henry D. Kitson and Miss Alice F. Blood. Mr. L. H. Dennis, Mr. Carl Colvin, Mr. J. G. Collicot, Dr. David Sneddon, Mr. George E. Myers, and Miss Lucy Silke discussed the problem from various angles and generally favored some form of closer cooperation. The result of the entire discussion was a resolution adopted on the following day to organize a central council on vocational education, consisting of one or two representatives from each organization, to work out details of closer cooperation and to recommend plans for legislative activity, publicity, reasearch and conventions. This council is to be the means of bringing the several organizations close to the N. E. A. and is to be authorized to prepare the departmental programs of the Department of Vocational Education.

The second session of the Department, on February 27th, was a joint meeting with the National Society for the Study of Education, and took up details of the present method in instruction for vocational purposes. Mr. A. H. Edgerton presented the general program: Mr. H. L. Briggs, Cleveland, discussed a typical city program; Mr. Henry D. Kitson discussed analysis as a basis of curricula building; Mr. Robert H. Rodgers described a successful method of individual instruction in continuation schools, and Mr. K. G. Smith, of Michigan, made a forecast on developments in vocational-industrial education.

Under the leadership of Supt. W. M. Davidson, Group H of the Department of Superintendence discussed vocational and part-time education. The speakers included Supt. Ernest C. Hartwell of Buffalo; Prof. R. J. Leonard of Teachers College; Supt. R. J. Condon of Cincinnati, and Associate Supt. Frank M. Leavitt of Pittsburgh.

CONTINUATION SCHOOL AT FOLWELL MILLS

The continuation school of the Folwell Mills, at Philadelphia, Pa., is located in a corner of a busy worsted mill in the manufacturing district of the Quaker city. The classes are conducted as a part of the continuation school system of the city of Philadelphia, and are composed of boys and girls between the ages of 14 and 16 years, who are employed in the mill and who spend one hour and twelve minutes each day in the classroom. The remaining two hours are spent in vocational training in the factory. The instruction is given by an experienced worker and records of each pupil are kept on special cards provided by the firm for this purpose.

The boys and girls are arranged in five groups. Where more than one minor works at the same frame or loom, each child is assigned to a definite group, thus reducing to a minimum the interruption of the work. The two teachers employed for the work divide their time into five periods of one hour and twelve minutes each and they take charge of the various groups in alphabetical order. On Mondays each group has a twenty-minute lesson in music, with the remaining fifty minutes given to hand weaving. On the remaining four days, all the groups receive instruction in regular school subjects.

In all the work the point of departure is found in the lessons in hand weaving. The aim of the work is to make the boys and girls thoroughly familiar with each process in the weaving of cloth, and at the same time, to point out the vocational opportunites of the work. The training offered is intended to give such an understanding of the entire process of weaving that those who make the work their life vocation, may have a proper conception of the work and its value as a community industry. For those who do not make the industry their life work, the study of the industry has a broadening influence since it provides a knowledge of cloth and offers a sympathetic understanding of the tasks involved in the work.

The work in hand weaving covers an entire term and includes a study of plain weaves, basket weaves, twill weaves, checks and plaids, satin and fancy weaves. In the study, the pupils dissect samples of the weave, then analyze the design. The design is then woven by interlacing strips of black and white paper into a mat form. From the mat, a copy of the weave is made on squared paper, red ink representing the warp threads on the face of the cloth, and blank squares indicating the filling picks on the face of the cloth. Finally, a pattern is woven with woolen thread using a cardboard square as a loom. When all the weaves have been studied, the pupils analyze the fabrics and make original designs for submission to the mill superintendent. The best of these designs are selected. From the cloth woven from his or her plan, the pupil receives enough material for a suit or dress.

Whenever possible, the academic work is correlated with the lessons in weaving. In the arithmetic class, the necessary calculations are taught; in spelling, attention is given to the meaning and spelling of the technical terms employed; in the geography class, lessons are given on distribution of wool-bearing animals, methods of obtaining wool fibres, the location of wool markets, process through which wool passes from the sorting and scouring of the raw products to the finished woven cloth, and finally the problems of transportation. Classroom instruction is, in many cases, supplemented by visits to the various departments of the factory where the particular process studied is actually carried out.

BIRDHOUSES MADE BY STUDENTS OF MR. GEO. E. LODLE, EMPORIA, KANS.

The pupils are required to write brief descriptions of what they have observed from factory visits, and a prize of $5 is given by the manager for the best composition. For the second best composition a prize of $2.50 is given, and for each of the two best papers written by girls, material for a dress is given.

The firm cooperates in the work to the best of its ability. In addition to the prizes above mentioned, a book is given to the boy and girl who maintain a perfect attendance record for the year. Last year there were twenty pupils who were so rewarded on the basis of their attendance records.

PROPOSE NEW APPRENTICESHIP PLAN

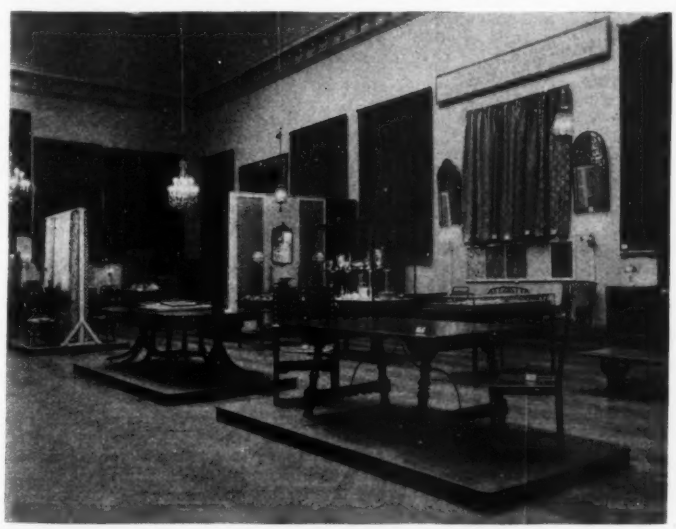
At Laurel, Nebraska, a new plan of apprenticeship training for vocational students in the senior high school has been worked out under the title of the "Laurel Apprenticeship Plan." The plan was evolved in September last as a means of assisting senior boys who had no definite idea of what they would like to do after graduation. Three of the senior boys took advantage of an opportunity to enter the banking field and learn the business. Each student was required to put in a half day every day at the bank, at no salary, for which he was given two high school credits. The other half day was given to high school study, the students taking two other high school subjects. The bank officials have gladly cooperated in the work and are given due credit for the success of the experiment at Laurel.

It was suggested that the experiment be made the beginning of an introduction to the practical aspects of present day education and that full credit be given by the university for the work as elective subjects should the students decide to enter college later.

It was suggested that boys be similarly given the opportunity to take up work as mechanic, carpenter, blacksmith, or anything of a like vocational character. This idea was carried out with the result that one boy has been apprenticed as a carpenter, another has taken up work in an electric light plant, and one girl has entered the telephone office to learn the work there. In all, six high school students have regularly been employed five half days a week, at the same time continuing their high school work leading to a high school diploma.

The purpose of the apprenticeship plan has been to give the high school student an opportunity to do some kind of work so that he or she may be able to begin some definite work after graduation. It gives the student a chance to discover just what he may desire to do in after life; it also shows him what he does not want to do.

Before taking up the work, the student must express a desire for some particular line of work. He must be acceptable to the employer. A pupil who chooses the new plan understands that it is serious work and not



GENERAL VIEW OF THE EIGHTH EXHIBITION OF AMERICAN INDUSTRIAL ART AT THE METROPOLITAN MUSEUM OF ART, NEW YORK.

just a chance to escape school work. The pupil is under orders from his employer and is graded on promptness, efficiency, courtesy and general attitude. He must do whatever is expected of him by the employer but at the same time, the employer must not impose on the student but must give him every chance to learn the business.

Each pupil is required to complete one half-day's work to obtain two school credits. All pupils work on the basis of a business day and are expected to be at work at 7:30 or 8:00 o'clock each morning, depending on the employer. It is also expected that pupils choosing the plan shall work without pay. This prevents pupils from desiring the work merely for the money in it, and it also leaves the employer free to offer individual help in return for the labor performed. Pupils may work for pay during vacation when school is not in session.

The plan has been found very successful in Laurel, as is evidenced by the desires of employers and students alike to continue the plan. It has been found that businessmen take more interest in the school, in the young people, and best of all, that they assume a part in developing the character of the young people of the community. Where students have expressed a wish to learn the business, and are mutually agreeable to all concerned, employers frequently give them the opportunity to continue in their employ. For the present, the apprenticeship plan is limited to students of the junior and senior high school classes. Supt. H. H. Linn, who is the originator of the Laurel apprenticeship plan, believes it has proven its ability to produce results in vocational training, and he offers it as a practical suggestion to other cities in seach of a workable method of this character.

VOCATIONAL GUIDANCE IN BUFFALO

The vocational guidance committee of the Buffalo, N. Y., school system, headed by Allan H. Nichol, in beginning its work makes a statement in which the following appears:

"Recorded experiments are not numerous, and indeed the movement is still too young to have produced results of permanent value in determining the content of school courses or the method to be followed by counselors. There is, nevertheless, a slowly growing body of well defined and widely acknowledged tendencies.

"The following is a list of the principal directions in which our beginning discussions led us.

I. Teacher instruction (acquaintance with term).
II. Introduction of study of occupations.
III. Placement and follow up of pupils at work.
IV. Educational and vocational advice.
V. A study of reasons for leaving school.
VI. A study of graduates who have attended higher institutions.
VII. Attemps to adjust work of school.
a. To meet local needs.
b. To provide proper training.

NEW BOOKS.

Analysis of the Cabinet Makers' Trade

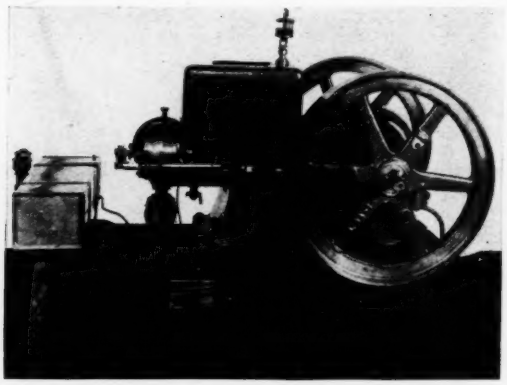
By Leslie G. Stier, University of California Trade and Industrial Series No. 2, Division Bulletin No. 13, Division of Vocational Education of the University of California and of the State Board of Education, Berkeley, California. Price $0.40.

This bulletin is a clearly written analysis presenting the material in three parts. Part I of the bulletin carries well arranged material on the present division of the trade, demands, and opportunities; types of training in different kinds of classes; explanation of the method used in making the analysis and working suggestions as to how to use the analysis. The content of the bulletin is planned to assist teachers who are familiar with the form of analysis appearing in bulletins of the Federal Board for Vocational Education and described in "The Instructor, the Man, and the Job," by Charles R. Allen. Typical job instruction sheets are carried in the bulletin worked out in clear detail. Analysis is also made by units. Part I includes a list of supplementary subjects and a list of reference books on cabinet making.

Part II carries an analysis of the cabinet makers' trade by operations under the units assembling, machine operation, and bench work. Part III is an analysis of the trade by products. This material is included on large separate sheets accompanying the bulletin. Four charts are included on separate sheets entitled furniture construction open, framed up furniture; second, furniture construction, enclosed furniture; third, special interior work; fourth, stair building. These separate sheets give in column arrangement, first, statements of type specifications, objective, required information, auxiliary information.

Charts and supplementary material indicate clearly the relationship of analysis of the trade by operations for instruction and use of such instruction in the cabinet makers' trade as it is called for in the manufacturing of different products. The bulletin is indexed.

Any teacher of cabinet making in any school and especially in the vocational school will find this bulletin of immediate and continuous value to him in his teaching. Its content is well selected, well arranged, and accurately tied up to the trade.—C. A. B.



GAS ENGINE CAST, MACHINED AND ASSEMBLED BY STUDENTS IN THE RAMON DE BALDIOROTY SCHOOL ,SAN JUAN, PORTO RICO.

Bypaths of Color Photography.

By O. Reg. Cloth, octavo. Price, $2.50. E. P. Dutton, & Co., New York, N. Y.

This book presents an extremely technical discussion of color photography by the "subtractive" method. The author is a practical photographer of long experience who has originated many new ideas in color photography and has a complete grasp of the several systems, theories, and devices now in use.

The American Decimal System. Reprint from the Congressional Record, January 17, 1924. A statement of the principles employed to decimalize our system of weights and measures.

Textiles and Sewing Materials.

By Mary Brooks Picken. Cloth, 267 pages, illustrated. Published by the Woman's Institute of Domestic Arts & Sciences, Scanton, Pa.

The author initiates her students into a knowledge of textiles. She deals with cotton, linen, wool and silk, their origin and growth. Spinning and weaving, and the evolution of production from its primary stages to modern methods, are well described.

Several chapters are devoted to lace making, embroideries, etc. One chapter deals with mending, darning and patching. Household sewing in all its essential phases is fully treated. The book is well illustrated, and is supplied with an exhaustive list of definitions on textiles and garments.

Lacquer Work.

By G. Koizumi. Cloth, royal octavo. 112 pages. Price $4.50. Isaac Pitman & Sons, New York.

Lacquer work has always interested western peoples as a romantic form of wood finishing. The old oriental pieces and the eighteenth century European adaptions possess a richness and charm that no other form of decoration, even the natural grain of fine cabinet woods, can approach.

The present book is a practical statement of the processes of lacquer work such as the western craftsman can attempt. Each of the materials is fully described and directions are given for preparing them. The processes of preparing the ground, of applying the decoration, and of finishing and toning pieces are carefully detailed and fully illustrated. A series of European and Oriental pieces in Collotype completes the book.

The book removes much of the mystery which has surrounded lacquer work and while the various special types of Chinese and Japanese lacquer are not described, there is ample, practical information for any good craftsman to attempt very creditable work.

Decorative Leather Work

P. Wylie Davidson. Cloth, octavo, illustrated. Price, $2.50. Longman, Green & Co., New York.

Although leather has been a favorite craft material in American schools there has been but little printed material to aid the teacher and practical worker. The present book, prepared by a recognized teacher and craftsman, is welcome because it combines the viewpoint of the man who has long handled classes of young folks and knows how to make technical processes and new methods clear and interesting, and at the same time has a strong sense of the dignity and human value of an old and useful craft. In nineteen brief chapters the book carries the reader through all of the usual methods of working leather for various decorative purposes, exemplifying principles and processes by numerous useful projects. The illustrations are complete and suggestive of typical forms of articles and decorative motifs. The index is in the form of a novel glossary.

Blueprint Reading

By Joseph Brahdy. Cloth, 108 pages, illustrated. Price, $2.50. Published by D. Van Nostrand Company, New York.

This book is a very thorough course in the reading of working drawings and is especially intended for the machine shop trades. The theory of mechanical drawing and the practices and conventions common to the machine trades are presented in extremely simple language and are very fully illustrated. The entire course of instruction is definitely applied in the two final chapters to a study of assembly and detail drawings of a large globe valve and of a tool grinder.

The author very wisely insists that the students do some simple drawing to illustrate the principles which they study. Interesting review questions and suggestions for practice in reading blue prints are added to the several chapters.

Color Harmony in Dress

G. A. Audsley. Cloth, 12 mo., 133 pages. Price, $1.25 net. Robert M. McBride & Co., New York, N. Y.

In the teaching of color our high schools have been notoriously weak in such practical and useful applications as dress design. True they have attempted it, but few have gone into the subject sufficiently, or efficiently, to give girls a ready working knowledge beyond a few broad, basic principles. The recognition of the subtler types of complexions and the application of simultaneous and successive contrasts are rarely studied or mastered. The present book discusses first the importance of color as applied to dress, and then takes up successively the principles of color harmony by analogy and contrast, the difficulties of simultaneous contrast, the application of color principles to dress in persons of various complexions, and finally the symbolism of color. Throughout the author reenforces his statements of principles, his technical facts, and his entire discussion by a subtle appeal of the value of color for enhancing woman's charm, for expressing her refined and artistic taste, and for increasing her dignity and repose. The book will be useful in secondary schools, particularly in advanced trade classes of dressmaking, millinery, and sales persons.

The Magic of Communication

By John Mills. Paper, 38 pages. Gratis from Information Department, American Telephone & Telegraph Co., 795 Broadway, New York, N. Y. An intensely human descriptive story of the operation of the telephone. It is equally valuable for introductory science, household mechanics, and current topics classes.

Handbook of Electrotyping and Stereotyping

By Robert F. Salade. Cloth, 120 pages, illustrated. Published by the Oswald Publishing Company, New York.

The subject of electrotyping and stereotyping has become so important a branch of the printing industry that the present volume will find a ready reception. The author, after briefly recording the history of electrotyping, deals with the economy and uses of electroplates. He goes into the details of making electrotypes and the paraphernalia and accessories employed in their production. In a similar manner he covers the subject of stereotyping. The illustrations are helpful in making the studies more clear.

Industrial Publishing.

By Horace M. Swetland. Cloth, 289 pages. Published by New York Business Publishers' Association, Inc. New York City.

The printed page has become an important factor in the industrial life of the nation. Vocational training, as exemplified in the schools, has laid the foundation, but subsequent instruction has reared the superstructure to splendid proportions. The trade journal has made a remarkable contribution to that efficiency which characterizes the mechanic arts and the mediums of production and distribution.

CLASS IN PIPE WORK AT THE BUILDING TRADES SCHOOL, CHICAGO. C. L. BAILEY, DIRECTOR.

The book in hand deals with the practical side of the trade publishing business as such. It discusses the organization of such a business, editorial direction, and the production of instructive reading matter, typography, circulation, advertising, etc. The place of industrial publishing in modern business is adequately defined.

Auto Repair Practice.

By L. A. Emerson and Lynn C. Jones, Published by the Century Co., New York City.

The authors of Auto Repair Practice have evidently fully appreciated the fact that the best auto mechanics are those with a background of machine shop experience. The lure of the motor car for many youth is in its speed and power. Back of the speed and power, and back of the sweetly performing automobile unit is long list of hand and machine tool processes.

In the case of the rebuilt automobile the hand processes are all important. A sense of the mechanical fitness of things must be cultivated in the young apprentice or student who today is going into the automotive trades direct from school. There is but one way to acquire manual skill in manipulating parts and tools, and that is actually doing a multiplicity of jobs in a creditable fashion. It would seem to the reviewer of the text that this fundamental fact has been most carefully held in mind by the authors.

While not all essential processes of hand repair practice have been covered, those most fundamental to the trade have been covered, with the exception of those incident to the repair of ignition, starting, lighting, battery, tire and body units. It is in no wise a book on automobile theory. Current automobile construction is not illustrated nor discussed. It is essentially a book of processes of doing separate and individual jobs of hand work. The first impression in looking through the book is that it is a splendid text for use in the machine shop department of an automobile school. The first impression is strengthened by thorough examination.

The text is beautifully bound in red imitation leather. It comprises 443 pages, and 90 illustrations, most of which are line drawings illustrating the processes involved. In the first part of the book appear thirty job sheets on making a hammer, mounting a ring gear, soldering copper tubing, making a valve grinding tool, etc., etc. The second part contains nineteen jobs on such items as use and care of hand tools, valve grinding, brazing, babbitting, etc. The appendix has some very valuable suggestions on the teaching of auto repair practice and a number of reference charts and tables. Within the limited field to which the authors have confined themselves, it is the best treatise which has come to my attention.—R. F. K.

Evening Classes in Anthracite Coal Mining in the Public Schools of Pennsylvania. By William Penn Loomis, supervisor of industrial education, Harrisburg. Bulletin No. 6, of the Trade and Industrial series No. 4, 1923, Department of Public Instruction, Bureau of Vocational Education, Harrisburg. The pamphlet points to the need of mining instruction, and outlines the method of organizing classes, the objectives of the courses, entrance requirements and standards for the operation of the courses.

NOW ARE THERE ANY QUESTIONS?

Cement Floor Treatment

401. Q: Do you know of a paint for cement floors that will stand washing and hard wear? We have used Kover-floor and a Battleship Deck Enamel, but water takes it right off.—G. B. J.

A: We would recommend R. I. W. Cement Filler and Cement Floor Paint manufactured by Toch Bros., 5th Avenue, New York City. In writing them, give them details of the previous treatment given this floor in order that they may intelligently advise you as to its reconditioning.—R. G. W.

Fuming Oak

403. Q: I have been told that by boiling ammonia and letting the steam come in contact with the wood was better than just the ammonia fumes, in fuming oak. Is this true? G. B. J.

A: In commercial practice it has been found desirable to somewhat increase the humidity in the fuming box by opening a steam valve about one quarter turn for an hour. This enables the wood to more readily absorb the ammonia due to the conveyance of the moisture. This method, however, has been superceded through the use of water stains which are more permanent, cheaper and free from the annoyances of ammonia.

Child Labor

419. Q: Do all of the States in the United States have a child labor law? Does the law demand the child to attend school part time? What states do not have vocational training?—E. R. P.

A: (1) All states have some legislation which directly or indirectly controls child labor. The strong efforts which have been made for national legislation have been entirely due to the fact that in more than thirty states the state labor and compulsory education laws are inadequate to insure a reasonable minimum safeguard for childhood in the direction of health education, safety, moral hazards, and general social welfare. The laws of states like New York, Massachusetts, Wisconsin, etc., are perhaps above the proposed national standard and are very effective, but those of several eastern industrial states and of most southern and western states are decidedly inferior.

We would suggest that you apply at your public library for a set of the bulletins of the Children's Bureau, U. S. Department of Labor, touching on this subject. If the library has not filed them write to the Bureau at Washington or to your Congressman for these especially:

"Trend of Child Labor in the U. S., 1920 to 1923"—Reprint from the Monthly Labor Review, September, 1923.

"The States and Child Labor," The Childrens' Year Leaflet, (Bureau Publication No. 58).

"Child Labor in the U. S."—Ten Questions Answered. (This covers all facts to November, 1922, and is fairly adequate.)

(2) The school laws of some thirty odd states provide for part time education from 14 or 15 to 16, 17 or 18 years of age. In some states one day a week is required and in some states evening school attendance is rather unsuccessfully demanded. Successful compulsory continuation schools are in operation in Wisconsin, New York, Massachusetts, New Jersey, Pennsylvania, Michigan. Voluntary schools are operated in 32 states.

(3) All the states in the Union have accepted the Smith-Hughes law and have some form of vocational education. You can get full information from the annual reports of the Federal Board for Vocational Education.

Wood Finishing Problems

Q. 448. What can be done to prevent hot cabinet glue from becoming mouldy when left for a few days without heating? How can I refinish a birch-walnut stained top in good condition, except for spots where the oil is off and the wood grain raised? How can I finish a table top in oil so that hot dishes will not affect it?

A. * * * "Moulding of glue is caused by the growth of fungi on the tannic acid in glue in the presence of free moisture. This most often occurs when glue is heated and allowed to cool with the cover on the glue pit. The moisture condenses against the cover and enables the fungi to develop. For these reasons I have found it advisable to leave the cover off the glue over night after heating. Occasionally it may be necessary to add about two drops of carbolic acid to a quart of glue as preventive to the growth of moulds.

"I do not believe that it is practical to oil finish a birch walnut top so that it will not be affected by dishes. There are no water proofing properties in the oil and turpentine mixture used, and considerable observation leads me to believe that this finish is of little practical value. A firm with which I was formerly associated made a practice of keeping several mahogany tables in stock in order to take care of an occasional call for an oil treated mahogany table. The treatment consisted in giving the sanded mahogany top a coat of linseed oil reduced with two parts turpentine and containing one teaspoonful of japan drier to each pint of mixture. This was applied hot once a month, the excess being wiped off with a piece of cloth. These tables were treated for two years before being sold but subsequent observation led me to believe that the so-called water proof condition was merely a state of mind on the part of the owner. The most practical suggestions on my part would be to resurface the table, sponge it to raise the grain; water stain it the desired color; size with a coat of high grade floor varnish reduced one-half with turpentine and dried for one week. It should be sanded glass smooth with a split 6-0 paper and then filled with a dark brown filler to match. Let dry forty-eight hours, dust off and varnish with full strength floor varnish. Let dry one week and sand and revarnish. Let dry one week and water rub with FF pumice stone, felt pad and water. Clean up with oil polish."—R. G. Waring.

Lumber Chart

Q. Is the lumber chart printed in the February issue of the MAGAZINE available in large size?—O. T.

A. The lumber grading chart is only a preliminary publication and is not available in wall size. Small copies may be had gratis by addressing the U. S. Forest Products Laboratory, Madison, Wisconsin.

WHERE TRADE SCHOOL TEACHERS COME FROM

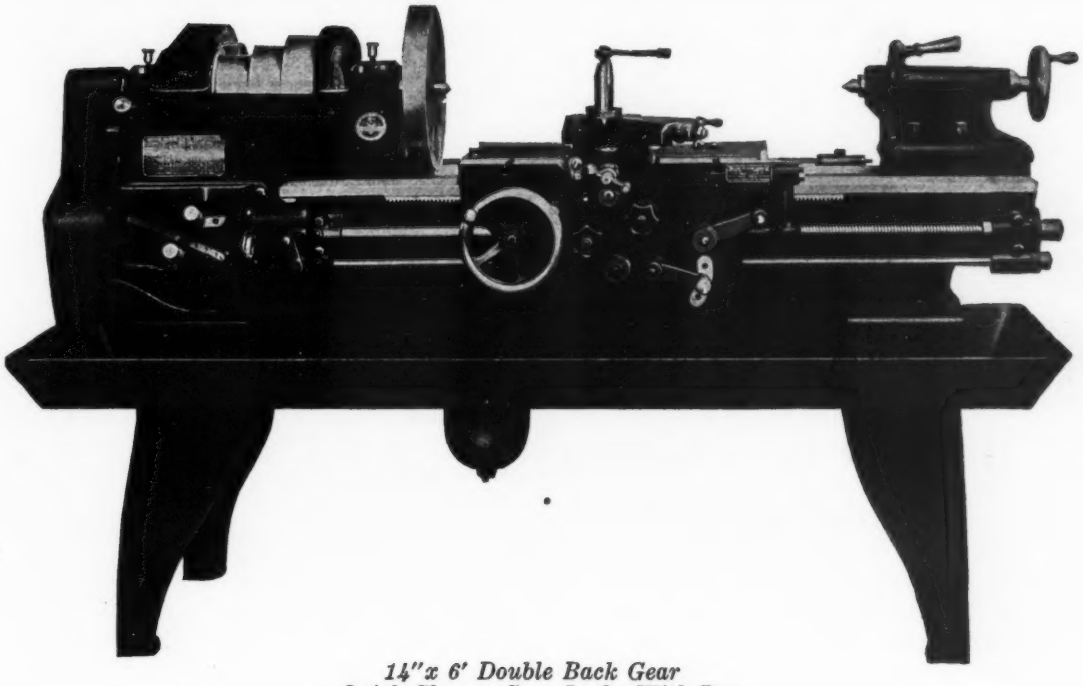
The Wisconsin Apprentice, a leaflet published by the Industrial Commission of Wisconsin, has sought an answer to the question: "From what trades do our trade teachers come from?" and supplies the following answer:

"The machinist's trade heads the list. Then follows the carpenters, cabinetmakers, printers, electricians, auto mechanics, and patternmakers, in the order named. The analysis shows further that alarmingly few instructors come from the trades of plumbing, bricklaying, molding, painting and decorating, baking, and a few others, to say nothing of plastering. Why are not these trades better represented? They are all recognized as growing trades. The present scale of salaries paid trade teachers amounts to more than a journeyman can earn at the trade; at least this is true when the earnings covering a period of years is taken."

New Industrial Arts Course. A course of study in industrial arts, for fifth, sixth, seventh and eighth grades, has been issued in pamphlet form by the board of education at Cincinnati, O. The material for the course was furnished by committees representing each of the four upper grades of the elementary schools and was approved the past summer by Supt. R. J. Condon.

The plan suggested in the outline differs materially from the former practice of making a prescribed list of models or using a prescribed list of tools. Under the plan, it becomes necessary for teachers to start their classes on uniform projects and to vary the work as soon as a study of the individuals makes it possible. The work is based on the special interests and capacities of boys and the teacher acts as the guide in directing the desire for manipulation and construction in such a way that the shop experiences shall constitute a liberal education. The work is graduated in skill for each grade so that boys gain in dexterity and knowledge of tool processes as they advance through the grades.

The course is indicative of a well-thought out plan, of a desire to meet the special interests of boys in tool work, and is offered with the idea of developing an appreciation of good workmanship, good design and finish wherever shop work is taught.



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NEWS AND NOTES FROM THE FIELD

Makes Survey of Industries. Mr. S. Lewis Land, Director of Mechanic Arts at the Tennessee Polytechnic Institute at Cookeville, has begun a survey of the industries of Tennessee as a means for determining the needs of vocational training. The industries included in the investigation are wood working, metal working and automobile. A survey of mechanical drafting has been proposed.

The question of establishing a vocational guidance bureau is being considered at Utica, N. Y. The cost is estimated at $2,000 a year. Those urging the project hold that Pittsburgh, Pa., is spending $50,000 a year in maintaining several vocational guidance bureaus.

A study made by the Rotary Club of an eastern city showed that twenty-seven per cent of the fathers were business men and that sixty-one per cent of the sons aspired to a business career. An editor comments that "many boys who aspire to white collar jobs will be disappointed. Once many fathers apprenticed their sons to learn a trade and so made sure that they had secured a means of livelihood for their boys. But not enough apprentices can be found for work which seems dirty or distasteful, though it pays well."

The New York Vocational Teachers' Council elected Henry G. Osborne as its president. Mr. Osborne succeeds John Frenzel. Other officers and committees elected for the year were: Vice President, Frances Martinez; Recording and Corresponding Secretary, Wilhelmina Liebler; Financial Secretary, Grace Sauer; Treasurer, D. Blumberger; Sergeant-at-Arms, Robert W. Jackson; Trustee, Arnold Avery; Union Educational Council, Grace Sauer and Peter A. Peterson; delegates of Central Trade Labor Council, Paul Augustine, John Frenzel and Henry Osborne; Committee on Vocational School Interests, Paul Augustine (Chairman), Grace Sauer and Clifford Gray; Auditing Committee, Anna Orth, Margaret Martin and Susan Harris.

Principal Joseph P. Kennedy of the Wilby High School, Waterbury, Conn., has issued a questionnaire as a means of obtaining information about graduates and their employment. Further questionnaires are to be prepared with a view of obtaining definite and comprehensive information as to wages and suggestions from employers as to training. Conferences between the faculty and employers of students are to be held with the idea of discussing courses of study and gaining helpful suggestions for improving training facilities.

The industrial arts department of the Cincinnati, Ohio, schools made 2191 toys for the Junior Red Cross under an agreement whereby the latter body paid the cost of the materials employed. The schools also made 366 toys for mothers' clubs and other organizations and the plan has worked out well.

Compulsory attendance at night schools is now being exacted by all carpenter apprentices in New York City. According to director of evening schools Morris E. Siegel, this educational program is being undertaken for the purpose of meeting the shortage of trained workers in the building trades. The carpenters' union is the largest organization in these trades. It includes cabinetmakers, bench hands and millwrights.

New Movie. "The Modern Pied Piper," a two-reel motion picture just released by the United States Department of Agriculture, portrays a city-wide anti-rat campaign. The picture is based on Browning's Story of the Pied Piper, and lays stress upon the fact that rats cost the American public a sum running into hundreds of millions of dollars a year. It points out the toll in human life and suffering and shows that the extermination of rats must be supplemented by rigid rat-proofing of buildings to make the work effective. The film is in two reels and is distributed through the educational film service of the United States Department of Agriculture.

Educational Films. A series of striking educational motion picture films, depicting the mining, preparation and utilization of various mineral substances, has been made available to the public through a new system of distribution arranged by the United States Department of the Interior, through which films may be obtained from the Bureau of Mines through state or sectional centers. There is available at the present time nearly a hundred educational films prepared by the Bureau of Mines in cooperation with industrial concerns. These films relate to coal, petroleum, sulphur, iron, marble, copper and other minerals and have been gathered with the aid of 27 cooperating agencies located in different states.

Vocational Carpentry Class. A class in vocational carpentry has been opened in the high school, Reno, Nev. The class has an enrollment of sixteen boys. During the fall the boys built five garages and one chicken house. With the coming of cold weather and the discontinuance of outdoor work, the boys assembled and placed eight hundred seats in the junior high school and built cupboards for the schools. The spring work will include the building of bungalows. The work is in charge of Mr. G. M. Gray.

Construct Cedar Chests. The popular project in the manual training shop at Reno, Nev., during the year has been the cedar chest. A total of twenty cedar chests were turned out by the students in the classes. A mahogany table designed in Egyptian style was turned out by a second-year student in manual training. Mr. G. Levant Thompson is the instructor in charge of the manual training work.

Print Tickets. The fifth entertainment of the winter season given by the Automotive Trade School, of Cincinnati, O., was held

(Continued on Page XXIV)

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Shade 15 in. diameter. Frame (knocked down), electric fixture, insulated cord and all weaving and finishing materials for beautiful duo-tone enamel finish.

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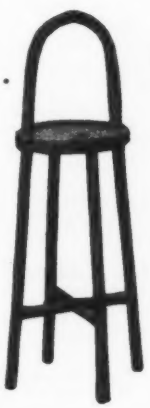

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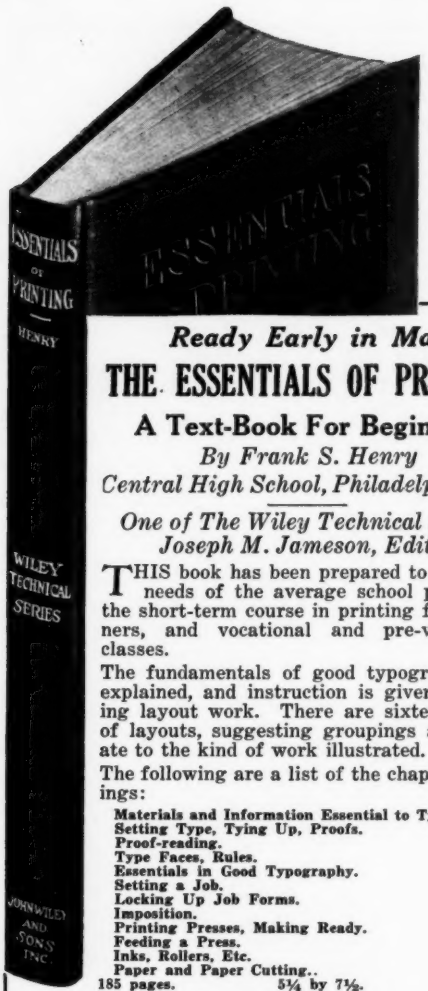

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IAM 4-24

(Continued from Page XXII)

February 6th, at the East High School Auditorium. The tickets for the entertainment were designed and printed by the pupils of the printing trade school.

Printing Products Varied. A varied line of printing has been turned out by the Junior High School Shop at New Britain, Conn. In November last, the school pressroom turned out the circulars for the Junior High School's Open Night. The circulars contained the program for the evening and were printed in brown and blue on a light colored, medium-weight paper. The shop also designed and printed attractive Christmas cards in green and red, with a border of gilt. As a January project, the shop prepared a very fine pictorial calendar. The paper and printing were in blue, with border lines of brown and the top of the calendar was a reproduction of a summer landscape scene in four process colors. The calendar sheets themselves were small, set in the center of the page and the space at the sides was occupied by a series of brief, but well-timed axioms.

School Press Designs Calendars. The school press of Leominster, Mass., has turned out a series of small monthly calendars. Each calendar sheet is for one month and is printed in black on a blue stock. At the bottom of the sheet there is a short saying reminiscent of child life.

Announce Art Lecture Series. The School Art League, of New York, has announced a series of art lectures, to be given during the spring of 1924 for members and junior members interested in the various phases of the subject. There will be illustrated talks for pupils of the elementary schools, gallery tours for junior members and teachers, and illustrated talks for older members and juniors. The lecture series will be given at the Metropolitan Museum of Art and will cover cartooning, furniture designing, art metal work, portrait painting, famous paintings, famous men in history, and famous artists having a love for animals.

Prize Cover Design Contest. The local committee on arrangements for the meeting of the Eastern Arts Association, to be held in May, at Atlantic City, N. J., has announced a prize cover design contest. The competition is open to all art school and high school students and is intended to make possible the selection of an appropriate cover design to be used at the convention.

Two classes of prizes, Class A and Class B, are provided for art students and for high school students. For art students, a first prize of $25, a second prize of $15, and a third prize of $5 are offered. For high school students, a first prize of $15, a second prize of $10, and a third prize of $5 are provided. All of the designs will be on display at the exhibition hall during the convention and those receiving awards will become the property of the association.

New Courses on Wood Treatment. The Forest Products Laboratory, of Madison, Wis., has announced a new group of instructional courses to be given during April. The courses comprise kiln-drying of wood, gluing, properties and uses of wood. The last group of courses in December attracted 44 men, bringing the total enrollment to 675 students. The kiln-drying classes which were the most largely attended, had a registration of 378 students.

Vocational Courses. The Hall Township High and Vocational School, at Spring Valley, Ill., during the past four years has introduced courses in printing, music, public speaking and automobile mechanics. An indirect result of the newer courses and functions in the school is a larger attendance and a corresponding decrease in per capita cost. The school reports an increase of approximately 80 per cent in enrollment in the face of a decreasing population. The school program has been arranged with a view of getting the larest number of pupils in the smallest number of classes coincident with efficient instruction.

Urges Fad Elimination. Mr. John W. Ferguson of Paterson, N. J., in a recent statement, urged that fads and fancies be eliminated and that only the practical in trade training be taught. He holds that boys should be taught how to care for tools before they are permitted to use them in actual work. He believes there is a great need at the present time for adequate trade training.

Vocational Conference. A conference of principals and directors of vocational schools in New Jersey was held in January, at the Paterson Vocational School. About fifty persons attended the conference. Addresses were given by Mr. John W. Ferguson, Mr. Harold F. Fuller, Mr. Martin J. Corcoran, and Mr. Frank R. Flower.

Vocational Guidance. A course in vocational guidance for teachers has been proposed at New Orleans, La., to better fit instructors who teach vocational training classes. It was the opinion of school officials that wrong, or inadequate training of children, in vocations is worse than no training. The nature of the child should be studied before attempting to guide his footsteps in the direction of a specific trade line.

Vocational Class. An evening class in cost calculation and dissection of silks has been opened at the evening vocational school, Paterson, N. J.

Approve Electrical Course. The school board of Newark, O., has approved the plan of Supervisor W. E. Painter for the teaching of electrical work in the manual training department.

Propose Vocational Center. The school board of Schenectady, N. Y., has proposed the centralization of trade and vocational work in the new technical high school which is to be erected. Under the proposed plan, the present high school will be limited to English and classical courses.

(Continued on Page XXVI)

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(Continued from Page XXIV)

Vocational Work Demanded. Asst. Supt. J. A. Starkweather of Duluth, Minn., in a recent statement holds that two factors are responsible for keeping up the demand for vocational education. These factors are a dearth of skilled workers and a rise in building costs. The trade unions seek to fill up their ranks with young men and the manufacturers seek lower costs for labor.

Compulsory Vocational Training. Prof. I. B. Morgan, director of continuation schools, Kansas City, Mo., has urged that vocational courses be made a required part of the high school program.

Trade Training Class. A state teachers' training class for vocational teachers has been opened at the Utica Free Academy, Utica, N. Y. Men from the local trades and industries, between the ages of 23 and 28, with five years of experience, are eligible to the classes.

Carpentry Work. The carpentry class at the Whatcom High School, Bellingham, Wash., has undertaken the building of a bungalow as its work for the second semester. The class is made up of boys who enrolled in the preliminary work of the course last September. The work of the first part of the year was mainly in woodwork and included the building of small structures such as bleachers and garages. The boys enrolled in the course are those mechanically inclined who have elected the work as preparation for a vocation.

Foundry Class. A class in foundry practice has been formed at the boys' vocational school, Newark, N. J. The course covers three years and is open to boys who have completed the sixth grade.

New Trade School. The new state trade school at New Britain, Conn., was opened on January 25th, when the building was thrown open for inspection by the public. The school offers instruction in machine shop work, toolmaking, drafting, architectural drawing, wood pattern making, automobile repair, masonry and bricklaying, plastering, concrete work, printing, electricity, building construction, cabinetmaking and millwork. The school has an enrollment of 700 students and there is a constant demand for its graduates. The cost of the building is $100,000 and the machinery and equipment are valued at $300,000.

New Vocational School. The vocational school board of Stevens Point, Wis., has asked the common council for funds with which to erect a vocational school of the factory type of construction. The building is to be erected at an approximate cost of $25,000.

Exhibit of Textile Designs. An exhibit of original designs for textiles was recently held by the Roosevelt Junior High Art Students of Columbus, O., at the Art Gallery of the Z. L. White Company. The designs were made by the art students of the Roosevelt Junior High School and the work contributed effectively to the practical side of the students. The list of studies included 61 designs, which were selected and arranged under the supervision of Elizabeth Seitz Denig.

Health Poster Contest. Hygeia, a magazine of health, published by the American Medical Association, Chicago, has offered a series of 49 prizes for posters on health subjects prepared by high school students. The contest, which closes May 31, has for its purpose the stimulation of interest in health and its attainment among pupils in the schools, and the securing of posters for propaganda purposes. The first seven selected posters will draw prizes of $100, $60, $40, $30, $25, $20, and $15. The next six will be given awards of $10 each and the next ten $5 each. Twenty-five accepted posters will be recognized by prizes of $1 each. The jury of award includes Surgeon General Hugh S. Cumming of the U. S. Public Health Service; Mr. John T. McCutcheon, cartoon artist, and President Wm. B. Owen of the Chicago Normal College.

Pittsburgh Industrial Arts Association. A meeting of the Industrial Arts Association of Pittsburgh, Pa., and the vicinity, was held January 29 in the board of education conference room to discuss ways and means of reorganization. A board of directors representing the different types of industrial arts work was elected. The meeting was well attended by those in the Pittsburgh district. Regular meetings will be held throughout the school year, with round-table conferences and speakers capable of discussing important subjects connected with the work of the association.

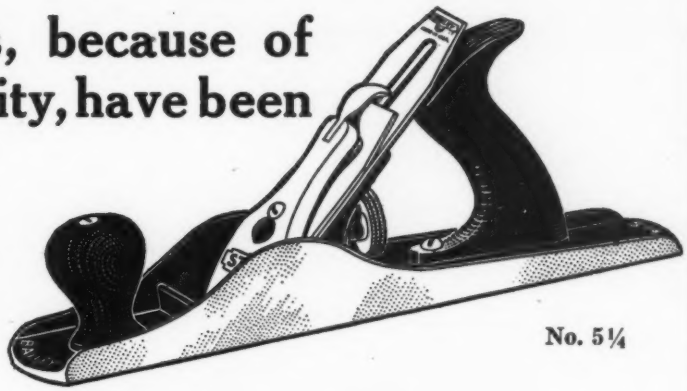
Art Education Bulletin. The United States Bureau of Education has just issued a bulletin on industrial education, entitled Circular No. 21, Suggestions on Art Education for Elementary Schools. The bulletin was prepared by Jane B. Walling, supervisor of art in the Toledo public schools, and should be of value to teachers of art and elementary industrial arts. It contains a fund of information dealing with the organization of teaching material relating to art in the elementary schools. Some of the topics treated are Scientific Basis for Color Study, Practical Uses of Art, Educational Value of the Museum, and Needs of Children as the Basis of Organization.

Trade Classes Formed. The department of vocational education of the Fort Worth, Tex., schools has been organized on a full-time basis for administering funds and for organizing home economics and industrial classes. The department which is in charge of Mr. Scott J. McGinnis, seeks to train workers for the trades and industries. Attention will be concentrated on the training of those already in the industries in the belief that the standards of those now employed must be raised, if there is to be a demand for trained workmen.

Applied Art Class. A class in applied art has been successfully conducted at the Madison, Wis., Vocational school since the

(Continued on Page XXIX)

Stanley Tools, because of their dependability, have been chosen by School Authorities for Manual Training Work for many years.



No. 5¼

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Booklet fully describing this plane sent upon request.

(Continued from Page XXVI)

opening of the second semester. The class at present works in sheet ivory and the making of novelties such as paper knives, curtain poles and book ends. Some work has also been done in copper etching and embossing. One of the pupils has completed a mahogany jewel box, decorated with ivory, which has been retained as an example of the work done by the arts and crafts pupils.

Apprentice Classes Formed. An apprentice class of seven pupils has been formed at the Vocational School, Fond du Lac, Wis. The class is made up of machinists, draftsmen, painters, plumbers and pipe fitters. The classes for apprentices are held one day each week from eight to twelve, and all boys over 16 years are eligible to membership.

Permanent Work Exhibit. At the Leavenworth High School, Waterbury, Conn., a permanent work exhibit has been installed in the principal's office. Panels have been installed upon which are exhibted the work of the students in art, wood working, drafting and machine shop work. The panels are removable so that the exhibits may be changed from time to time.

Vocational Classes. Three vocational courses have been introduced in the Lebanon High School at Lebanon, Ind.

Elementary Design. A class in elementary design has been formed in the evening vocational school at Paterson, N. J. The class is open to men employed in the silk industry and the work offers a foundation for the later study of cost calculation.

Wisconsin Trains Teachers. The training of vocational teachers in Wisconsin will be undertaken shortly under a program to be prepared by a special committee headed by Mr. George P. Hambrecht, state director of vocational education. Under the plan, Stout Institute will undertake to train teachers for industrial and home making classes. The Milwaukee Vocational School will train teachers already in the work and the agricultural instructors will take their work at the University of Wisconsin.

Wisconsin Vocational Conferences. A series of vocational conferences has been arranged for the state vocational teachers by State Director George P. Hambrecht. Between 25 and 60 instructors will attend each conference. The last three conferences to be held during April and May are: April 3-4, Madison, "Science;" April 10-11, Madison, "Commercial Subjects;" April 24-25, La Crosse, "Related Academic Subjects;" May 8-9, Madison, "Coordination."

Vocational Advisory Board. An advisory board of businessmen and artisans for the high school vocational department at Stockton, Calif., has recently been appointed by the board of education. The board is composed of representatives of the machine shop, automobile shop, carpentry shop, cabinet making shop, and print shop and will present information of practical value in the development of high school courses.

Girls Take Manual Training. Four girls of a 7A class have undertaken manual training work at Hyde Park, Chicago, Ill. The girls who attend the Kenwood School will undertake such problems as stools, trays and lamps.

New Vocational Courses. Three courses in automobile repairing, machine shop work and shop mathematics have been introduced in the evening school at Portsmouth, O. A charge of $5 per pupil is made for a ten weeks' course.

Opportunity School. An opportunity school for employed boys and men has been opened in one of the grade schools at Knoxville, Tenn. The school is conducted under the provisions of the Smith-Hughes Law and is open to both boys and men.

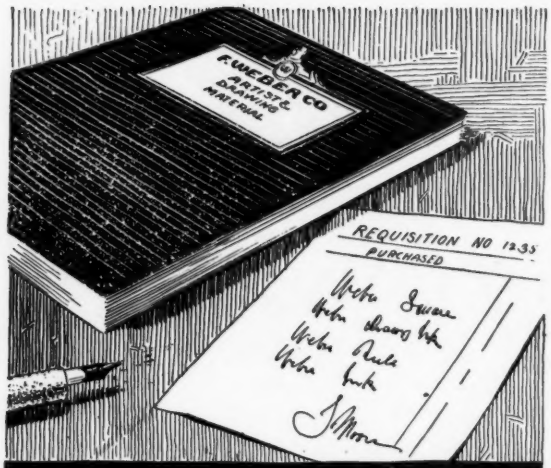
State Conference on Vocational Education. The annual state conference on vocational education for Maryland was held on February 8th and 9th, at the Hotel Rennert, Baltimore. Mr. J. D. Blackwell, state director of vocational education, was in charge of the conference, which was attended by 105 persons.

At the conference addresses were made by Supt. H. S. West of Baltimore; Dean W. S. Small of the University of Maryland; Dr. A. S. Cook, state superintendent of schools; J. C. Wright, Director of the Federal board for Vocational Education; Dr. Frank Leavitt, Associate Superintendent of Schools, Pittsburgh, Pa., and H. C. Spillman, educational director of the Remington Typewriter Co., New York City.

In the home economics section, Miss Frances Zuill, Baltimore, and Miss Helen Atwater, Washington, D. C., spoke on "The Meaning of Home Economics." Dean W. S. Small of the State University, discussed "Health Education," and Miss Elizabeth Shannon of the Maryland Art Institute, Baltimore, gave an illustrated talk on "Block-Printed Textiles." Three-minute reports were presented on various phases of home economics work. There was a round-table session on the subject matter of home economics work, with reports on such phases as foods, clothing, hygiene, household management and related science.

In the industrial section, Dr. Frank M. Leavitt of Pittsburgh, and Dr. F. T. Struck, assistant state vocational director of Pennsylvania, made addresses. Mr. H. C. Spillman of New York City addressed the commercial section. Mr. Eugene Edgeworth, Baltimore, spoke on the subject "If I Were a Commercial Teacher Again," and Mr. Charles Reigner of Baltimore, talked on "A Broadened Conception of the High School Shorthand Course."

The agricultural program was in charge of Mr. H. F. Cotterman, of the University of Maryland, and included talks by Dr. F. T. Struck on "Farm Shop Work" and by Mr. A. P. Williams on "Job Analysis as Applied to Agricultural Education." There were round table sessions on the subjects of agricultural education. teaching vocational agriculture, and reports of committees on extra activities of the agricultural department.



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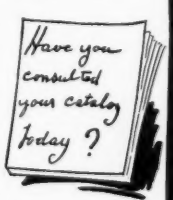

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Safety Calendar for Schools and Homes. A calendar for 1924 issued by the Carnegie Steel Company, Pittsburgh, Pa., represents a most original method of broadcasting the idea of safety in schools and homes. It is purely a safety calendar, the result of the work of the safety committee, and each of the illustrations carries a lesson in safety, conceived and executed by a school pupil in towns where the company maintains a plant.

The illustrations are the result of safety poster contests conducted in the schools of the mill communities in which approximately 7,500 posters were entered in the collection. There were three cash prizes given in each community in sums of $25, $15 and $10.

Each calendar contains thirteen pages, one for each month and the outside or cover page. Each page bears a reproduction of a poster drawn by a school child, a mention of the plant, and a portrait of the student who prepared the poster.

Much interest was shown in the contest by the school officials and in some communities the art instructors made this feature a part of the school work. The front cover, which is a very suggestive picture in color, was drawn by a high school student at the Munhall, Pa., high school, where is located one of the Carnegie Company's plants.

Juvenile Industrial Subjects. At San Antonio, Tex., a movement has been inaugurated for getting the home adequately to function as an industrial educational agent; for prevailing upon parents to train their children at an early age to master and habitually perform all the juvenile industrial home projects.

In the promotion of the movement, a four-page pamphlet containing a graded list of juvenile-industrial subjects has been prepared and sent to school patrons. The work comprises a knowledge of, and training in, the general upkeep of the home and those projects having a relation to the home.

High School Serves Industrial Community. The Richwood High School, at Richwood, W. Va., serves an industrial community. Most of the people in the community are engaged in various phases of the lumber industry. Not only is lumber manufactured, but clothes pins, butter trays, paper and leather are products of the factories. A new commercial department has been organized which fills a real need in the community. The home economics department has carried out some particularly effective work in its own line.

Vocational Opportunities at Bridgeport. In the junior and senior high schools of Bridgeport, Conn., a rather intensive educational and vocational guidance program has been introduced under the direction of the assistant superintendent. Dr. John M. Brewer, Harvard University, and Dr. Allen, assistant superintendent of schools of Providence, R. I., as well as several other men, presented the theory and practice of the work to the teachers.

A new cosmopolitan high school, offering six courses of instruction, is to be organized in the near future. The cooperative industrial course correlates with the works offered.

Exhibition of Decorative and Industrial Arts. The United States government, through M. Pierre Chabert, of Paris, has received an invitation from the French government to participate in the International Exhibition of Modern Decorative and Industrial Arts, to take place in the spring of 1925. The exhibition is to consist of four main groups, comprising architecture, furniture, wearing apparel, and theatrical, street, and garden architecture and decoration. The exhibit will include objects of all kinds, from the most ordinary to the most precious, in so far as they make life more comfortable, cheerful and agreeable. The exhibition will be of interest to merchants ordering, buying and selling the products displayed, the producers manufacturing them, the artists and artisans who created the models as well as the public, for whose diversion and education they are primarily intended. In order that private American exhibitors may participate in the exhibition, it is necessary that the federal government accept the invitation, and that it shall agree to erect the building and appoint the official commissions to be present at the time of the exhibition.

Evening Vocational School. An evening vocational school will be conducted at Knoxville, Tenn., for three months, beginning with January. The instruction will cover mechanical drawing, sheet metal work, textiles, typewriting and stenography. The cost for operating the school will be about $800.

Vocational Guidance. The subject of vocational guidance has been introduced in the high school at Pauls Valley, Okla., this year. The class has made a comprehensive study of occupations, particularly those represented in and about Pauls Valley. Classroom talks by representatives of various vocations are arranged and the students are encouraged to select their life work wisely.

First Aid for Plumbing Instructors. The National Trade Extension Bureau at Evansville, Ind., is offering free lesson sheets on first aid for plumbing instructors. The instructions tell how to teach the trade, how to interest the class, and offer helpful criticisms and guidance to the instructor who is teaching apprentices plumbing or steamfitting.

Mr. Stanley Steward, formerly at St. Johnsbury, Vt., has been elected state director of vocational education. The vacancy at St. Johnsbury has been filled by the appointment of Mr. G. M. Trafton, who has acted as assistant to Mr. Steward. Mr. Steward will have his headquarters at St. Johnsbury and will supervise the two vocational schools.

Mr. George R. Carr, instructor in manual training for two years at Etna, Pa., has accepted a similar position at the Dela Home State School, Willington, S. C.

Summer School Directory

THE STOUT INSTITUTE

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- Organization of Part-Time Home Economics
- Part-Time School Home Economics Methods
- Vocational Guidance
- Organization of Industrial Arts Administrative Problems
- Teaching Vocational and Industrial Classes
- Principles of Education
- Principles of Teaching Home Economics
- Lesson Plan and Job Sheet Making
- Part-Time School Home Economics Methods
- Organization of Home Economics

INDUSTRIAL ARTS—35 COURSES

- Furniture Upholstery
- Electrical I
- Printing I, II, III, IV
- Millwork I
- Cabinet Making I
- Sheet Metal I, II, III
- Woodturning I
- Home Mechanics I
- Radio
- Carpentry I
- Patternmaking I
- Machine Shop I, II, III
- Foundry I
- Auto Mechanics II, III
- Drawing
  - Elements of Architectural Drawing I, II, III
  - Machine Drawing I, II, III
- Bricklaying and Concrete I
- Forging II, III
- Woodfinishing I
- Elements of Woodwork I, II

PHYSICAL TRAINING—5 COURSES

- Football Coaching
- Basketball Coaching
- Track and Field Coaching
- Swimming for Men
- Swimming for Women

HOUSEHOLD ARTS—28 COURSES

- Color and Design I, II
- Household Physics
- Clothing I, II, III, IV, V
  - I. Undergarment instruction, hygiene, and budget
  - II. Blouse and skirt, designing, personal accounts
  - III. Cotton and silk dresses, dress accessories, budget
  - IV. Wool and linen dresses, professional work
  - V. Advanced clothing construction
- Costume Design
- Millinery
- Food Economics
- Textiles
- Nutrition I, II
- Foods I, II, III, IV, V
  - I and II. Elementary cookery, family service
  - III. a. Canning and preserving b. Fancy cookery
  - IV. Meal planning, preparation, and service
  - V. Experimental cookery
- Cafeteria Management
- Home Management
- Chemistry
  - Qualitative Analysis
  - Textile
  - Food
  - General
- Community Hygiene
- Microbiology
- Physiology and Hygiene

ADDITIONAL DEGREE AND DIPLOMA ACADEMIC WORK AND SCIENCE—22 COURSES

- Psychology IA
- Psychology IB
- Psychology II
- History Modern
- History, Industrial
- Economics
- Citizenship
- Public Speaking
- English Composition
- English Literature
- English Directed Reading I, II, III, IV
- Hygiene and Safety
- Materials of Construction
- Chemistry, Industrial
- Mathematics I, II
- Sociology
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MAINE VOCATIONAL SOCIETY MEETS

Plans are being completed for the second spring conference of the Maine Vocational Society, to be held May 22, 23, and 24, at Bangor. Mr. E. K. Jenkins, state vocational director, and Mr. M. S. Hill of the Great Northern Paper Co., rendered valuable assistance in the preparation of the program for the conference.

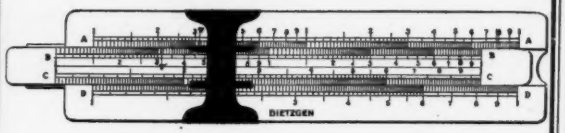
Mr. E. J. Franks, Redpath chautauqua speaker, will be on the program for the first day. On the second day, a group visit to the University of Maine will be made, and Mr. J. C. Wright, director of the federal board of vocational education, will talk. State Director L. A. Wilson of New York; President L. H. Dennis of the National Society for Vocational Education, and State Director F. J. Trinder of Connecticut will be speakers. Augustus O. Thomas, state commissioner of education, will also give an address.

In addition to the above program of well-known speakers, group meetings will be held where the different vocational departments will meet and discuss problems. Other speakers are being arranged for these sessions.

Mr. Stephen Patrick, of Westbrook, president of the State Vocational Society, will have general charge of the sessions. The home economics section will be presided over by Miss Florence Jenkins, city director of home economics, Portland, and Prof. Herbert S. Hill, of the University of Maine, will head the agricultural section. The industrial group has arranged a program which is in charge of Harold L. Pride, state supervisor of trades and industries, Augusta. The evening school principals and teachers have been invited to attend this meeting and a special session has been reserved for them. This section is to be in charge of Harold G. Noyes, principal of the evening school at Rumford. Vocational teachers from neighboring states will be present at the meeting and a large attendance is predicted for the 1924 meeting.

The present conference is the third to be held in the state. The first two were held at Portland and the third will be at Bangor. Last spring, Director E. K. Jenkins, with the assistance of Mr. W. G. Venn, planned and carried out a trip of inspection to the schools of Massachusetts and New Hampshire. At this time cities in Massachusetts and New Hampshire were visited by a group of forty Maine teachers.—**Harold G. Noyes.**

Miss Marguerite McDonald is the shop instructor in the junior high school, which was opened in January at Reno, Nev.



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NEWS FOR SCHOOL BUYERS.

Caslon Type. Teachers of printing will be interested in a just been announced by the Mergenthaler Linotype Company. The pamphlet on Caslon Old Face Type, of which a complete series has booklet may be had by addressing the Publicity Department at 461 Eighth Avenue, New York City.

Bradley Issues New Catalog. The Milton Bradley Co., of Springfield, Mass., has issued its new Catalog B, illustrating and describing the art materials and supplies carried by the firm. The catalog lists material and equipment for use in color work, poster making, gesso decoration, art enamel, freehand and mechanical drawing, pottery, basketry, weaving, block printing, batik, and jewelry novelties.

New Disston Circular Saws. Henry Disston & Sons, Philadelphia, Pennsylvania, have just shipped to a saw mill in Washington two saws which are declared to be the largest in the world. Each is 108 inches in diameter, and is intended to be used in cutting giant cedar logs into shingle bolts. The saws weigh 795 pounds each, are made of special steel, and are fitted with 190 spiral teeth of special Disston design. The rims of the saws travel at the rate of 130 miles per hour.

Distribute Christmas Cheer. S. C. Johnson and Sons, the well known manufacturers of wood finishing products, distributed at Christmas time bonus checks amounting to $72,828 to their 300 employes. The checks ranged from 5 per cent of the annual wage for employes who have been with the firm one year to 30 per cent for employes who have been with the firm for 30 years or more. The checks were presented by Mr. Herbert Johnson, Jr., at a gathering in which all the employes of the firm took part.

The firm has for many years carried life insurance for its employes and has worked out a system of unemployment and disability insurance. A pension system is operated.

PUBLICATIONS RECEIVED.

Auto Mechanics Shop Problems. By G. W. Dodge. Published by the Austin High School Press, Chicago, Ill. The pamphlet contains typical instruction sheets concerning the problem, the tools required, the method to be employed in the work and questions adapted to the work in hand.

A Project in Education With Special Reference to Teaching Agriculture. By A. W. Nolan. Educational circular No. 24, Issued by the University of Illinois, Urbana. Among the projects discussed are wheat growing, dairying, crops. An outline of type problems in crop projects is given to illustrate types of job analysis.

Apprenticeship Program for Plumbing and Heating Industries. Prepared by the apprenticeship department of the National Trade Extension Bureau, in conjunction with the apprenticeship committee of the National Association of Master Plumbers. R. E. Maloney, Evansville, Ind. The pamphlet offers typical outlines of courses conducted in schools of this type throughout the country. There is a suggestive apprentice agreement and an application blank to be filled out by the student desiring to become an apprentice.

A Discourse on the Chemistry of Artists' Paints, Vehicles and Varnishes. By F. W. Weber of the F. Weber Co., Philadelphia, Pa. The pamphlet discusses mineral and organic pigments, lake pigments, oil colors, lead whites, red pigments, oils, varnishes, fixatives and mediums.

The Producer. A magazine published bi-monthly by the students of the Boys' Vocational School at Atlantic City, N. J. The paper is prepared, edited and printed by the boys of the School under the direction of an editor-in-chief, and with the aid of a faculty critic. The paper has departments given over to sports, carpentry, electrical work, printing, drafting, radio, and evening vocational work.

Manual of Instructions for Welding Operators. Price, $5. Published by the Welding Engineer, Chicago, Ill. This manual has been prepared primarily for the convenience of welding schools and departments where the welding encyclopedia is used as a text. It contains a complete set of outlines of lessons, exercises and examinations for the training of welders. The outline of lessons has been prepared for the use of instructors, welding foremen, welding supervisors and welding students, and offers full information on every topic in the outline. The manual contains two color charts, illustrating the appearance of metal at varying temperatures and the proper adjustment of the oxy-acetylene flame. The book contains 437 pages and over 600 illustrations and is handsomely bound in a leather grain limp binding with gilt edges.

Analysis of the Management of a Farm Business. By C. H. Schopmeyer. Bulletin No. 88, October, 1923. Issued by the Federal Board for Vocational Education, Washington, D. C. The bulletin is intended to determine the kind of training which the manager of a farm should have and is specifically directed to vocational teachers in all types of agricultural schools, to teacher-trainers, and to state supervisors, for the purpose of assisting in the selection and organization of training content for effective courses of agricultural instruction.

Art as a Vocation. By William T. Bawden. Industrial Education Circular No. 20, October, 1923. Issued by the Bureau of Education, Washington, D. C.

Standards of Eighth-Grade Attainment in Shopwork. By William T. Bawden. Industrial Circular No. 18, October, 1923. Issued by the Bureau of Education, Washington, D. C.